THE METAL INDUSTRY
WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD, THE BRASS FOUNDER AND FINISHER AND ELECTRO-PLATERS REVIEW
A TRADE JOURNAL RELATING TO THE NON-FERROUS METALS AND ALLOYS.

OLD SERIES
VOL. 14, No. 4.

NEW YORK, APRIL, 1908.

NEW SERIES
VOL. 6, No. 4.

THE MANUFACTURE OF TABLE HOLLOWARE.

By W. J. Cottrell.

In the manufacture of table holloware many kinds of metal are used, such as copper, white metal, nickel silver, sterling silver, etc., but for first-class hotel tableware nothing equals the nickel silver, as it is built to stand the hard usage which it is bound to receive in such places.

While the first cost is a little more than white metal, it is much more durable, and most of the first-class hotels are being furnished entirely with it.

In a modern holloware factory many very costly drops and drawing presses are used to-day that were not used a few years ago, making possible many more handsome shapes than could be made before they were used. Not very long since the spinner, whose part in the making is to give the work its desired shape, was obliged to take

FIG. 2.

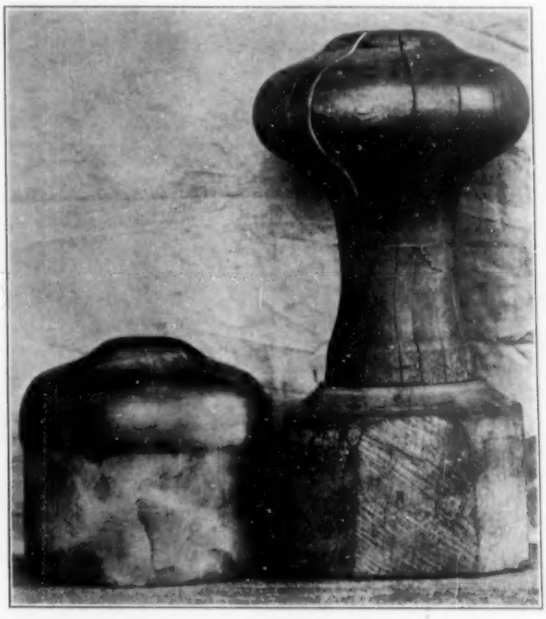


FIG. 1.

his work from a flat circle, but we now have, with the help of powerful drawing presses, a shell or dish which is drawn to the diameter and height of the chuck or form over which the work is to be spun.

Now, in making this ware we start with the designer, who makes a sketch of the desired article, which is next given to the spinner, who from either wood or metal turns the chucks or forms into shape and with steel tools and a speed lathe the metal is slowly worked over them.

To illustrate, I will take a 12-oz. coffee pot, giving the different operations through which it passes before leaving the spinner. No. 1 in cut is a wood chuck which has a thread cut in the bottom and is then placed on a speed lathe; No. 2 is a shell, the product of the press, drawn from a circle 9 inches in diameter and which is now 4 inches in diameter and 6 inches deep. We place this shell over the chuck, and to hold it there we have a block of wood, the shape of the tip end of the chuck, held in place by the tail stock of the lathe, and the metal is worked into the shape of the chuck No. 1.

We now have the bottom of the pot.

Next we must place the shell on a steel stake and hammer it thoroughly all over, after which it is placed in a gas furnace and red hot.

After cooling we place it over No. 3 in the cut, which is a sectional chuck composed of fifteen pieces, and it is worked into shape No. 4, after which it is again hammered and heated red hot and cooled, returned to the same chuck and worked into shape No. 6, and so on to Nos. 7, 8, 9, 10, and No. 11 is the finished pot so far as the spinner has to do with it. No. 5 shows the chuck, No. 3, taken apart, which must be done each time in order that the work may be removed from it.

FIG. 3.

After making the cover and base, which are both spun from a flat circle, the pot is ready for trimmings, such as spout, handle, hinge, etc. The spout and handle are stamped from a flat piece of metal placed between two steel dies which are placed in a drop press and with a powerful blow the pattern and shape are both raised at the same time. They are of course stamped in halves, and are soldered together with silver solder.

The beading around the top, center and base is made

by running a flat strip of metal through powerful steel rolls which have the pattern cut in them.

The silversmith now takes the pot, fits the handle, spout, cover, base and beading, and they are all soldered together with silver solder.

The polisher now takes the pot and after several differ-

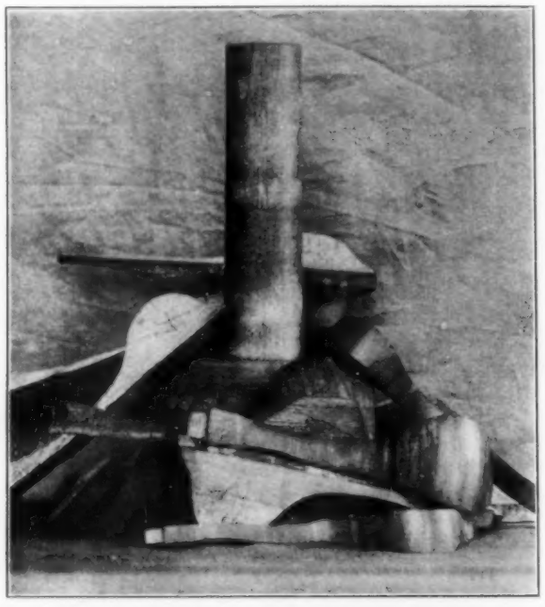


FIG. 5.

ent grades of pumice, coarse and fine, together with leather and cloth wheels, we have a surface ready for plating.

The pot is next given to the insulator, who inserts two pieces of ivory into the handle, making it proof against heat.

FIG. 6. FIG. 7.

The engraver next cuts any lettering which may be desired, and the pot goes to the plater, and after several different baths it is placed in a tank containing a solution of pure silver, and with the help of an electric current a deposit of silver is evently distributed over the surface of the work, and we next go to the burnishing department.

Here with steel tools the work is planished and hardened and given a finish which actually "resists wear."

Cut No. 12 shows some of the many pieces of this ware finished. Another line of hotel ware is made by using the same body, cover and base of nickel silver and mounting them with white metal, which is not quite as expensive and is a very good article. The spout and handles of this class of goods are cast hollow in moulds made of bronze metal.

In the all white metal ware the shaping or spinning of the several articles is not so expensive, there being no hammering or annealing to be done. The metal is placed on the chuck and finished in one operation, the trimmings are made practically the same as in nickel silver white metal mounts, and the plating, finishing, etc., the same as in nickel silver.

In making this line of goods nearly every man must be a skilled mechanic, such as the modeler, who makes the design for trimmings in wax; the die sinker, who cuts the design in steel; the machinist who makes the dies for drawing shells, etc.; in fact every man must be a careful workman, and the tools used must be of the very best.

FIG. 8. FIG. 9.

One of the presses used in drawing up work weighs 28 tons and many smaller ones of quicker action help to reduce the cost of these goods.

The writer, having spent over twenty-five years in the manufacture of these goods, and having noticed many improvements in that time, can say with pleasure that they have not all been in the line of machinery, but the owners have made many improvements for the health and comfort of the help, such as doing away with many of the large driving belts and shaftings, and putting in electric motors for each department.

More attention is paid to keeping the factory painted

FIG. 10. FIG. 11.

at regular intervals and a force of men is kept constantly at work cleaning and dusting.

All new additions to the factory are made fireproof and with all first-class sanitary appliances.

METALLURGY AT OXFORD AND CAMBRIDGE.

The jewelry industry has of late years furnished many evidences of its enthusiasm for technical study and research. The latest example is the dual gift of £10,000 each to the Cambridge and Oxford Universities by the Goldsmiths' Company. In each case the gift is for the purpose of founding and endowing a Readership in Metallurgy, such readership to be associated with the name of the company. In both cases grateful acknowledgements have been tendered by the heads of the universities of these munificent gifts.

GAIN-SHARING WAGE PAYMENTS.

By W. L. Churchill.

In these times of strenuous efforts to reduce costs and yet not cut wages or established piece rates a method of wage payment that has been tried out and accomplishes these results should be of interest to manufacturers who are facing this dilemma or who may be interested in increasing the efficiency or output of present forces.

This method of wage payment corrects so many defects and removes so many limitations of other methods in use that its intelligent application produces results very gratifying to concerns adopting it.

The method retains to workmen the advantage of day work, inasmuch as they are guaranteed and paid their day rates in any event. On the other hand, the manufacturer retains all the advantages of piece work, with the added benefits of progressive reduction in the direct as well as the indirect labor costs, with each increase in production, at the same time simplifying the clerical detail necessary with regular piece work.

FIG. 12. SPECIMENS OF TABLE HOLLOWARE.

The plan consists of crediting groups or gangs of workmen with piece rate labor values of each operation or collection of operations performed by them, individually or as groups, and if non-producers are included in the group a percentage ratio equal to the maximum efficiency expected for this labor is added. Against these credits is charged the hourly rate of each individual for the length of time employed on the group or gang. Fifty per cent. of any excess of credits over charges is distributed pro rata among all workmen employed on the group by determining what per cent. of the total charges this gain is and increasing each workman's wages by that per cent. for that pay period.

For example, if a given group (which may be of any number, such as an entire room or department) performs work whose piece rate values plus the expense ratio for its non-productive labor should equal $1,500 for a given pay period, and if the charges (*i. e.* the day rate wages) for this group should equal $1,000 the group or gang has made a gain of 50 per cent. over their day rates. One-half of this is distributed among the workmen by adding 25 per cent. of each man's hourly rate wages to his pay; the balance reverts back to the company.

This method of payment is similar to bonus plans, except that the earnings are pooled instead of being treated individually. Some of the advantages are that any discrepancies in rates, such as being too high or too low, are equalized, and owing to the practical impossibility of obtaining absolutely correct rates in every instance this is a fair method of caring for such inequalities.

The method resembles "gain-sharing contracts," the difference being that in the latter the gains are usually shared only between contractor and company and require term agreements, while the "gain-sharing wage payment plan" gives every member of the inclusive group a share in the gains, consequently stimulates the efficiency of the whole group by financially interesting each member. Yet no term-agreements are necessary, as it is a purely voluntary contribution on the part of the employers.

Older gain-sharing plans contemplated and used total cost values of work delivered as a basis for credits and included supplies and materials used in their charges. This necessitated careful periodical inventories to determine the gains and these, therefore, could only be determined at infrequent intervals. By the gain-sharing wage payment plan no inventories are required and workmen get their gains every week, thus constantly reminding them of the degree of efficiency attained by the group or groups on which they are employed.

The unit groups can be of any size from a single man to the whole plant if desired. The most effective method is to treat each room or division in charge of a foreman separately. This quickly determines the relative efficiency of different foremen.

Less care is necessary in affixing piece rates where this method of payment is in vogue than with straight piece work, as slight errors in judgment in fixing these rates have a less serious consequence to the company

owing to the fact that but one-half of any excess earned over the day rate of the workman employed is paid for the work.

It is practicable with this method to include many lines of work that would not be done on piece work, such as miscellaneous work too variegated to pay to make time studies, yet whose average cost per unit is relatively stationary; large work on which groups of men work collectively, yet whose individual efforts are not ratable; many strictly non-productive functions whose cost bears a reasonably stationary ratio to any item in accounting.

Where piece work is already in vogue no injustice need be done to the already highly efficient men, as a proper adjustment of day rates will readily care for this. Foremen can properly reward industrious and willing men by increasing their day rates, yet with the knowledge that high day rates lessen dividends he is not disposed to use this power unreservedly as it will affect his own earnings.

Summed up, the gain-sharing wage payment plan retains the advantages of other present methods of wage payment with a range of applicability second only to straight day work and profit-sharing plans and with less clerical detail than any method except straight day work. It is quickly applied, returns are immediate and tangible and with proper judgment in the initial installation results beneficially to employers as well as to employees.

Bookkeeping, cost keeping and accounting methods are not disturbed.

The principle of the plan is to automatically induce team work, and it is not uncommon to increase the production of a gang previously on straight piece work by over 30 per cent. and making a corresponding reduction in labor costs.

LIQUID FUEL IN BRASS FOUNDRY PRACTICE.

By W. V. Best.*

As liquid fuel is the fuel of the twentieth century and as it, with electricity and compressed air, plays such an important part in the manufacturing world to-day, I believe a few points on its use in brass foundries will not prove uninteresting.

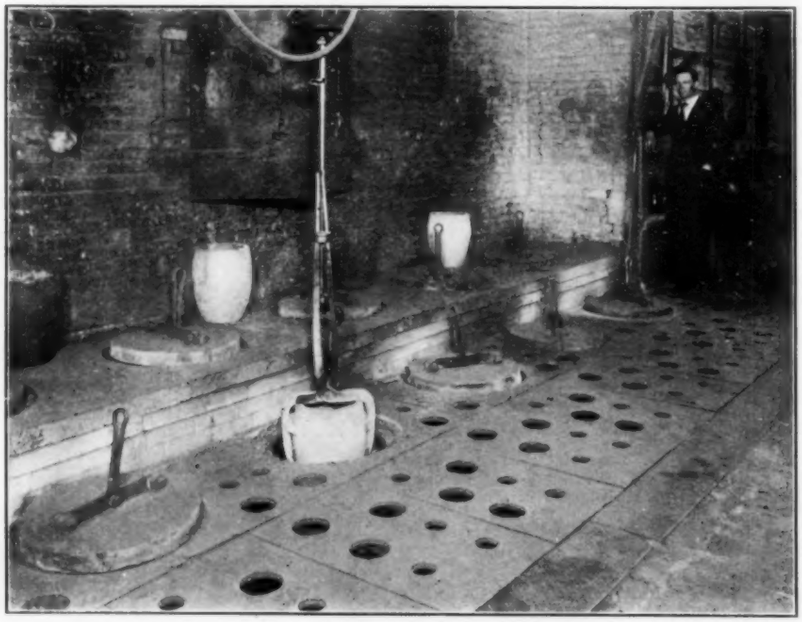
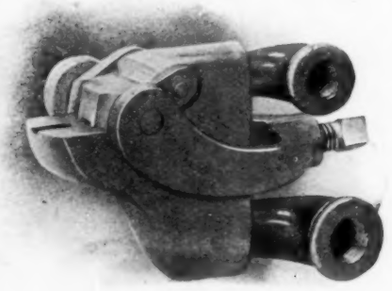


FIG. 1. BATTERY OF 12 CRUCIBLE FURNACES.



HYDRO-CARBON BURNER.

There are two methods of melting brass, bronze, or other alloys with this fuel, viz., by means of crucible melting furnaces or by open-fired furnaces, where the metal is made molten in large quantities. In this article I do not desire to discuss details as to the superiority of one method over the other, but will confine myself to the former.

Furnaces of this type have been installed in one of the largest brass works in New York City and the illustration shows a crucible being raised by an air hoist in the ordinary manner from a battery of twelve crucible furnaces. Of this battery the six lower furnaces are direct-fired, while the upper ones are indirect-fired.

Each of the direct-fired furnaces is equipped with a hydro-carbon burner of improved type, which is capable of thoroughly atomizing any gravity of liquid fuel (either oil or tar), and is also provided with a combustion chamber so placed that the flame is tangential. By means of this combustion chamber of proportions adequate for the perfect combustion of the atomized fuel, and the tangential flame, the heat is so evenly distributed that the bottom of the crucible is as hot as the other parts, whereas, without the use of this combustion chamber, the bottom of the crucible, much to the melter's disgust, is sure to be the coolest portion.

The lower furnaces are each vented by a flue of sufficient size to remove all the consumed and inert gases. These vent flues connect with the battery of indirect-fired furnaces above so that the waste gases heat the charge of metal in these upper crucibles from 80 degrees F. to about 800 or 1,000 degrees, which of course is a great saving in fuel. If desired, the waste heat from the indirect fire furnaces or preheating chamber can be used in the drying of cores, the quantity of heat used for this purpose being controlled by a damper.

The direct-fired furnaces are provided with slag openings so that in case of the breaking of a crucible the

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metal will flow down into the pit, from which it can easily be removed when it again becomes solidified.

The operation of this battery of furnaces is very simple. In the morning all the furnaces (both direct and indirect) are charged at the same time and when the first charge in a direct-fired crucible is poured, the melter removes a crucible from the indirect-fired row, which has by this time been preheated, to take the place of the crucible that has just been poured, and then he recharges the indirect-fired furnace with a new charge of metal. Using this method of preheating, melting ordinary brass in No. 70 crucibles, a crucible can easily be taken from a direct-fired furnace every 40 minutes. In the melting of special alloys, such as 75% nickel and 25% copper, where higher heats are required, using this method, a crucible of the same size can be heated in about 70 minutes.

With liquid fuel any desired heat can speedily be attained and maintained and therefore with these furnaces and combustion chambers and burners of this type the question is not how much metal can be heated, but how much is desired. In other words, the quality of metal that can be melted is only limited by the endurance of the men handling the metal or operating the furnaces. The operator of the furnaces has the heat under perfect control, and by merely increasing or decreasing the fuel supply the metal may be heated as rapidly or as slowly as desired without fear of oxidization. Some foundry men do not desire to heat the metal so quickly and in this case a lighter fire is maintained in the furnaces. There are times when the metal must be held in the crucibles to accommodate the moulders and by cutting the fire to the minimum the metal may be held in the molten state as long as desired.

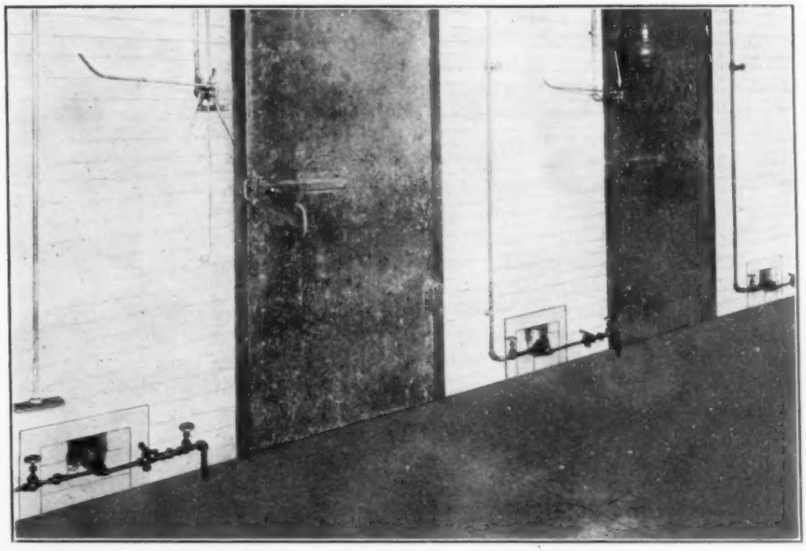
Each of the indirect-fired furnaces is equipped with a hydro-carbon burner, so that in emergency cases when a greater quantity of metal must be heated, these burners may be used in conjunction with the heat passing up from below.

The loss of metal in this battery of furnaces is no greater than when using coal or coke as fuel, while the economies are very marked, for, besides the output being greatly increased, there is no time wasted in waiting upon heats, in the handling of the fuel nor in the sifting and disposal of the ashes.

The hydro-carbon burner used on these furnaces, and here shown, externally atomizes the fuel. The oil or tar passes out of its channel perpendicularly to the compressed air and in so doing it is struck with such force that it is thoroughly atomized. As the atomizer orifice is above the fuel exit, the burners cannot become carbonized or clogged. Only sufficient compressed air is used through the burners to thoroughly atomize the fuel and evenly distribute the heat throughout the furnace, which is about one-sixth of the air needed to provide the oxygen requisite for the perfect combustion of the fuel, and therefore a low pressure or volume air blast of approximately 3-ounce pressure is placed under each hydro-carbon burner. To insure a steady flow of fuel to the burners, it has been found necessary to use a regulating cock having a "V" shaped knife-edged orifice, for the residum in the fuel will settle around the seat of a globe valve and in a short time entirely cut off the fuel supply to burners.

The regulating cock here shown has an adjusting device which, by means of a little set screw, can be set so that the fuel supply is cut to the minimum and yet insuring at all times that sufficient fuel is being fed to the burner to give the required heat. In order to obtain results from liquid fuel in any service, the fuel supply must be steady and therefore this regulating cock is of infinite value.

REGULATING COCK.



CORE OVEN HEATED BY LIQUID FUEL.

The accompanying cut illustrates the method of equipping with liquid fuel and ordinary core oven in which coal or coke has heretofore been used. One hydro-carbon burner is placed in the old ashpit of each fire-box and the combustion of the fuel is so perfect that no soot ever settles upon the cores. You will note that the controlling valves on the oil and air pipe lines are placed in positions convenient to the operator. By equipping core ovens thus, it has been found that, if desired, with liquid fuel as many cores can be dried in twenty-five minutes as can be dried in three hours with coal as fuel.

From the few points enumerated above, it can easily be seen that liquid fuel merits the attention of foundrymen in every section of the country in which it can be obtained. Its superiority over either coal or coke as a fuel cannot be questioned, but the essential points are to obtain good refractory linings for the furnaces and hydro-carbon burners that will thoroughly atomize either oil or tar fuel, for the installation of this new fuel is a science and the laws governing same must be observed.

"CIRE PERDUE" METHOD OF CASTING; ITS VALUE TO THE MANUFACTURER.

By John G. Niederer.

I have been asked the question as to the value of this system to the manufacturer of the usual commercial goods, and as to the possibility of successful introduction of such system into establishments that have trained organizations working their foundries in modern, up-to-date and most economical ways, and who are looking for even cheaper systems and methods. To such I would say do not attempt to introduce this system, for it will prove an expensive effort to do work for which it is not suited. Those making only the most ornate and most difficult undercut work will find such method good for those pieces that it would be impossible to bring out in French sand by false core molding.

Then again when a search is made as to the really successful efforts by men who have claimed to understand this system it will be found that the failures made by those claiming to understand the system are many. Most frequently manufacturers have been led into attempts to introduce this system who had really no use for it. One often comes across a person who has successfully cast a piece "cire perdue" by one of the many methods that he has read up in the encyclopedias and who really believes that he has now mastered this wonderful system; but were he put to the task it would be found that to produce work in commercial fashion and for commercial ends is a different proposition entirely.

The successful introduction of cire perdue work in the foundry is one of the most difficult problems, and in this I think even the most successful will agree with me, for it demands constant attention in all its various details from the making of the gelatine impression to the drying of the mold; and it spells ruin to depart in the slightest manner from the formula either in temperature or quality of ingredients. It is a fact that casters will insist on using certain alloys, deeming only such alloys safe for successful ends. While such an idea may be without strong proof to back it up, it nevertheless shows that the caster has had his trouble and is cautious to a high degree. I have found in my experience that the only reliable molding mass to produce commercial goods is either French sand or plaster and brick dust—not fire brick, which has a greater tendency to vitrify in combination with plaster.

I believe that the manufacturer making statuettes of artistic character may profit by this system when he has it all studied out and all his formulas right as regards quality and temperature of his gelatine—his wax, his molding mass and the drying and firing of his molds—and until he has all these mastered and noted correctly he will have many a headache, and many will be the castings that return to the pot. The mere reading of historical "cire perdue" will simply allure to effort, but the experimenting will bring to light the remarkable difficulties that must be mastered, and it will no doubt be best to arrange with a successful master of cire perdue rather than dabble, if one intends to try the system.

I have proposed the making of statuettes because the losses would be smaller in the beginning and not because large statues are not possible.

In an article written by Theodore Child for the New York *Sun* some years ago we read the following:

"One of the last acts of Gambetta, in his quality as President of the French Chamber of Deputies, was the purchase of an immense composition by the sculptor, Jules Dalon, representing Mirabeau and the Marquis de Dreaux Brézé (23 June, 1789), the famous scene where the great orator says to the envoy of the King: 'Go and say to your master that we are here by the will of the people, and that nothing but the force of bayonets will tear us away.' This work measures 6.54 meters by 2.56 meters; the figures are half life size; those of the principal group are in the round, and the remaining seventy and odd figures are in bas relief. In the Spring of 1890 M. Eugene Gonon succeeded in casting this work in one piece by the method known as la cir perdue, four tons of molten bronze having been run into the mold."

From the above one must conclude that the system is capable of all that might be asked for small or large work of artistic character; but the history of the trials and tribulations of the Gonons, both father and son, is well known, and until the system has been further improved upon, it is my opinion that the manufacturer of articles of mediocre character had better stick to the sand methods, except, of course, where reproduction by false core method is impossible; then it would be better to give it out to the foundry having introduced and established the cire perdue methods, rather than experiment themselves.

SPLENDID SPECIMEN OF "CIRE PERDUE."

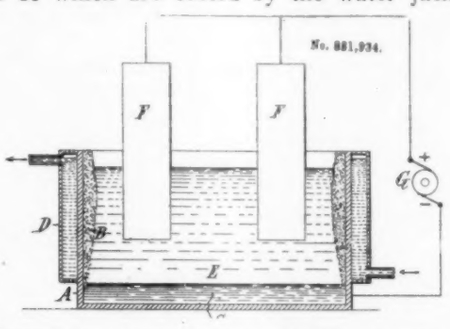
The cut here shown shows an instance where the possibilities of "cire perdue" are splendidly illustrated. The architect insisted upon the perfect reproduction of the

most difficult undercutting in the models. My falsecore molders, who were doing the best possible in French sand, were unequal to the task, my chisellers or chasers were overcrowded with work, so that to throw any more or additional labor in their department meant positive delay and failure in timely delivery. I concluded that cire perdue was our only salvation, and how beautifully the work resulted can be but poorly made manifest by the photograph, but must be seen. This chandelier was hung in the Harrisburg Capitol and is truly a magnificent example of the artistic possibilities of the American artisan if he be but given the chance to express the ego instead of being tied down to the limitations as imposed by the usual commercial practice; in these particulars I am speaking particularly of the chaser's art, so liberally carried out in this work. When one examines this piece it is easy to imagine the difficulties presented had not the system similar to that used by the old masters been used in casting—namely, the "cire perdue" system.

PRODUCING ALUMINUM-MAGNESIUM ALLOYS.

This invention—patented by Franz von Kugelgen and G. O. Seward, and assigned to the Virginia Laboratory Company, of New York city—relates to the production of alloys of aluminum and magnesium, certain of which have many valuable properties and are more valuable than aluminum. They are easily cast and machined and their melting point is low; it is possible to make castings at a dull red heat.

Reference being had to the drawing, A is an iron pot, the sides of which are cooled by the water jacket, D.



PRODUCING ALUMINUM-MAGNESIUM ALLOYS.

Such cooling would result in a chilled layer, B, of the electrolyte, which would insulate the sides of the pot so that no current would pass from the electrodes to the sides. C is a molten cathode which is at first of aluminum, but subsequently becomes the looked for alloy. E is the molten electrolyte and FF the carbon anodes. The generator, G, has its positive terminal connected to the anodes, FF, and its negative terminal to the pot, A.

In practice a suitable quantity of aluminum is placed in the pot and the electrolyte introduced. This consists of magnesium oxide or magnesium oxy-chloride dissolved in a suitable salt, preferably magnesium lithium fluoride. The effect of the electrolysis is to decompose the dissolved magnesium oxide, the liberated magnesium going to the cathode, where it alloys with the aluminum, so that the cathode becomes an aluminum-magnesium alloy wherein the proportion of magnesium is continually increasing. Magnesium oxide is fed continually into the electrolyte to replace that which is decomposed.

Instead of adding metallic aluminum, the aluminum may be produced in the cell simultaneously with the magnesium by double electrolysis. To this end, it is only necessary to mix aluminum oxid with the magnesium oxid and feed the mixed oxids into the fused bath instead of the magnesium oxid alone. Both oxids dissolve in the bath, and both are decomposed by the current, freeing both magnesium and aluminum at the cathode, so that the metals alloy continuously. By mixing the oxids in the proper proportions, the resulting alloy can be produced of any desired composition or richness. The process is thus rendered substantially a continuous one, it being only necessary to tap off the alloy from time to time without paying any attention to its composition.

BRITISH NOTES.

(From Our Birmingham Correspondent.)

The old practice of holding an inquest with regard to coin discoveries has just been resorted to at Hastings in connection with the finding of a number of gold coins at an ancient inn known as the "Stag." A workman was removing a casement over the door when he found a gold doubloon and eighteen other gold coins, all in a perfect state of preservation. There were altogether fourteen guineas and five Portuguese doubloons. The former bore inscriptions of James II., William III., George I. and George II. The foreign coins dated from 1734 to 1750. One of them has a double milled edge and bears on the one side a profile and on the reverse the inscription "Joannes V. D. G. Port. Et A. L. G. Rex."

The jury returned a verdict of "treasure trove," with the result that the coins are to be handed over to the government.

The Birmingham Lord Mayor appears to be making considerable demand upon the silver industry. A number of firms have tendered for the manufacture of the silver cradle, shortly to be presented to him, and yesterday a poor law committee representing Birmingham and some adjacent municipalities presented Alderman Sayer with a silver porridge bowl and a silver spoon to his youngest son, the world-famous baby for whom the silver cradle is now being prepared. The gifts are in recognition of various services rendered on behalf of the epileptic and feeble-minded.

MARKING FOREIGN WATCH CASES.

The agitation carried on by the Birmingham jewelers against the admission of foreign watch cases on easier terms in regard to marking than are imposed upon British watches has been completely successful. The Board of Customs has notified the Board of Trade that all gold and silver watch cases imported on and after June 1 will be dealt with by the Customs as plate within the meaning of Section 10 of the Revenue Act, 1883. This provides that gold and silver plate shall not be delivered for home use until assayed, stamped and marked according to law. The effect of this will be that these goods must henceforth bear the English hall mark instead of the free and easy foreign distinctions such as "fine silver," "9 K," "14 K" and "18 K," which have hitherto been allowed. These marks have enabled makers to utilize on a watch a metal dome, bezil and bow. This inferior metal has greatly facilitated unfair competition, especially from such people as unscrupulous mock auctioneers who have sold as gold watches containing the merest fragment of that metal. An important proviso will be that accompanying the British hall mark will be a special mark indicating that the watches are of foreign manufacture. It is believed that the reform will be welcomed even by the better class Swiss makers who have suffered from the competition of persons introducing quantities of inferior metal. Naturally the new regulation is popular among Birmingham jewelers.

THE TURRET LATHE AND ITS EQUIPMENT.

By Easy Way.

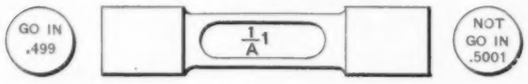
(Continued from March issue.)

Gauges.

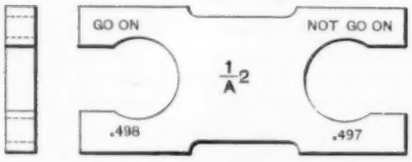
Gauges are of the utmost importance where interchangeable work is to be performed or where standards have to be maintained year after year. An order or a blue print tells a man what is wanted in the way of sizes, due does not tell him whether he is getting those sizes. Here is where the gauge plays its part, which keeps increasing in importance as work gets more exacting. Threaded plug and ring gauges are of inestimable value in the production of threaded and tapped work. An adjustable die can be marked ½ or ¾ inch, as the case may be, and still be cutting 1/32 inch above or below that size.

Taps always vary in size even when made to a gauge;

LIMIT PLUG GAGE



LIMIT SNAP GAGE



they also wear considerably and to produce good work must be ground and kept sharp, hence the necessity of good gauges which tell the operator whether his work is correct.

The threaded plug gauge should be made to the size required, great care being exercised to make sure the angle of the thread is correct. The ring gauge should be then made to fit the plug gauge so that it will go on if they are both absolutely clean. Work fitted to gauges of this description will go together with no slack. If the work does not need to be so exact the ring gauge should be made slightly smaller than the plug, according to the limit allowed. As much limit as possible should always be given, as taps will wear. The less the limit the harder it is to conform to it and the cost will increase in proportion.

For plain cylindrical work limit plug and limit snap gauges should be supplied. The plug gauge should be made so that one end will enter the hole marked with the size and the words "go in," the other end being marked with the size and the words "not go in." Too much stress cannot be laid upon the care with which limits are determined, as in years of manufacturing they play quite an important part in the prosperity of the concern.

The limit snap gauge should be marked "go on" at one end and "not go on" at the other end, and with the sizes.

As an illustration of their use suppose a hole is wanted not over ½ inch, 500/1000, and not under 499/1000. Then one end of the plug gauge would be made 499/1000 and marked "go in" and the other end would be 5001/10,000 and marked "not go in." The spindle that goes into the hole must turn freely. Then the snap gauge would be made 498/1000 "go on" and 497/1000 "not go on." The extreme limit in the illustration is 0.003/1000.

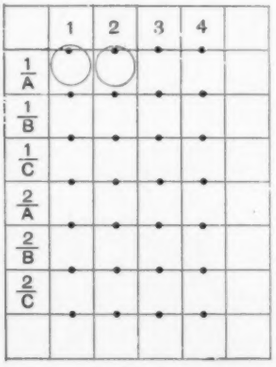
Another thing to bear in mind is that stock reamers are made standard sizes; therefore, make the "not go in" end of the plug gauges about 00.005/10,000 larger than the reamer to be used, which can then be used until it gets below the size of the "not go in" end of the plug gauge. The snap gauges can be made of ¼-inch flat steel. Adjustable gauges can be used where large quantities of work are being manufactured. It pays to have gauges that cannot be adjusted as there is less liability of error creeping in.

The accompanying sketches give a good idea of the different gauges. Where gauges are made exclusively for use on one particular article they should be marked so that there can be no mistake as to the article they are intended for. There are several very good systems for the marking and checking of gauges which will be explained under the heading of stock, cost, drafting room and tool storeroom systems.

System.

Nearly every business requires a system of its own, as conditions vary so widely in different establishments. The drafting room is the logical starting point. The manner in which the tracings are numbered and the different items are symbolized, so that the numbers and symbols can be carried right through the shop, will have great influence on the time consumed. The first thing to be considered is the number of parts in a complete assembled piece of work. This should be split up so that all

CHECK BOARD



parts that can be assembled and carried in stock ready for the final assembling are put each on its own tracing, which is given a number and the different items are marked with alphabetical symbols. Suppose the assembled part has 6 pieces. Then the tracing would be No. 1 and the name given the first item 1/A, the second 1/B, and the next 1/C, and so on. Wherever possible these symbols should be on the patterns, in either raised or sunken letters; this will facilitate location of the patterns, as they can be put in racks or on shelves with the symbol in plain sight.

The tools required to make each part are placed in their own drawer or compartment, which should have the symbol plainly marked on it. The tools should be stamped with their symbol and also numbered in the following manner. Say, for instance, 1/A requires 10 tools, then they would be marked from 1/A1 up to 1/A10. If B had 6 tools they would be marked 1/B1 up to 1/B6 and so on. The next tracing would be numbered No. 2 and the symbols used in the same way as No. 1.

Each employee should have sufficient checks to be able to give a like quantity in return for the tools he receives from the tool storeroom. These checks should be hung on hooks opposite their own symbols and under the number of the tool on a board provided for them, as shown in the sketch. This enables the person having charge of the tools to tell at a glance just where any particular tool is, if it is not in its own drawer or compartment. This system is first class where a limited number of articles are manufactured.

Standard gauges, also reamers, taps and drills should have a check board of their own with their sizes marked over the hooks instead of symbols. For instance, if a ¾-inch reamer is given out the employe gives a check with his number on in return. This is placed on the ¾ reamer hook.

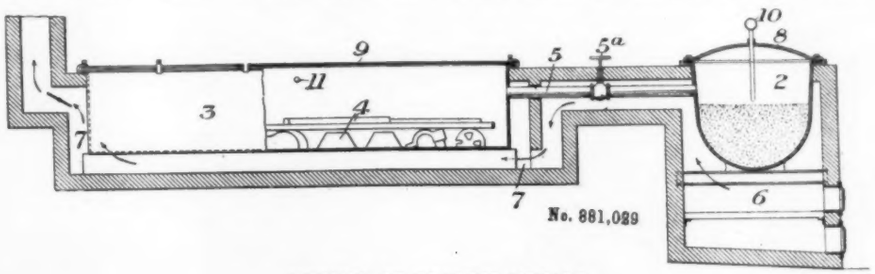
After an article has been finished it is sent to the stock room and placed in a bin which has a printed card of standard card index size. This should be ruled and printed on one side only, a column for the date, one for the plus and minus signes, and one for quantities which may be either put in the bin or taken out for shipping or assembling purposes. If 500 pieces are put in the bin the stock keeper puts down the date, a plus sign and the quantity, in their respective columns. Now if 200 pieces are taken out of the bin a few days later the date, minus sign and the quantity, are entered directly under the prior entry. A line is then drawn under the 200 which is subtracted from the 500, leaving 300, which is marked in the next line in the same column. This should be the stock the bin contains. The card should be placed in a pocket on the face of the bin, with the unprinted side out, and upon this should be marked plainly the symbol of the part or parts that the bin contains.

(To be continued.)

METHOD OF COATING METALS.

In recent issues we have had several articles dealing with the coating of metals, particularly with the coating of metal with zinc by the so-called vapor process. We now have to describe a method of providing a protective coating different from any heretofore mentioned, and for which letters patents have been issued to Alfred Sang, of Sewickley, Pa.

In carrying out this invention the articles to be coated are first cleaned by any of the well known methods and are placed in a receptacle, which is then covered and sealed. This coating box or receptacle is connected by a pipe with a retort containing the dust of the coating metal. In the case of zinc this dust is preferably the ordinary commercial zinc dust which contains some oxide of zinc. If the dust does not contain the oxide, such oxide should be added to it. It is also preferable to employ a reducing or fixing agent, such as cyanide of potassium, asphaltum, or coal oil, which may be placed in the retort, in the coating box, or applied as a coating on the articles in the box. The proportion of the reducing agent may be varied widely without materially affecting the result. The pot containing the zinc dust is then heated to a point below the melting point, but sufficient to vaporize the zinc dust. This temperature is from 200 to 500 degrees centigrade, although this may be varied within certain limits. The coating receptacle is also heated in order to prevent the deposition of the coating metal upon its inner surface, and this temperature may also be varied widely, though the inventor prefers to heat the box from about 200 to 300 degrees centigrade.



METHOD OF COATING METALS.

Referring to the drawing, 2 is the retort containing the metal dust and the reducing agent, 3 the coating box containing the meal articles, 4, and 5 is the pipe connecting the boxes; 8 and 9 represent the covers of the boxes.

When the dust in the retort is heated to the vaporizing point, the vapor from the dust passes into the coating receptacle, reacts with the reducing agent and deposits the coating metal upon the articles. This coating is of a tough, strongly adherent character and under most conditions is of a fine granular nature, and bright or else crystalline. It is substantially amalgamated or alloyed with the surface portion of the article itself. The depth or thickness of the coating may be varied, according to the length of time the operation is continued, the temperature employed, etc. Pyrometers, 10 and 11, are used so the heat may be kept within limits.

Instead of supplying the reducing agent in the retort with the metal dust, it may be applied to the articles in the coating receptacle. In such case it has been found that where asphaltum is used as the reducing agent forming a coating on the article, the zinc or other metallic deposit will be formed under the asphaltum. This is stated to be of special advantage in structural steel, since the structural shape will not only be provided with the protective metallic coating, but this coating will in turn be covered by the asphaltum, without any further operation. Articles provided with a covering of paint or non-metallic material may thus be provided with a metallic coating under the non-metallic covering, using the reducing agent in either receptacle, or as the non-metallic coating itself.

Although Sheffield ware first had a standard mark of value in 1300 and the maker's mark, designated by law, in 1363, an influential goldsmiths' gild existed earlier than 1180.

The Treasury Department has decided that a dross composed of tin and lead is not entitled to free entry under paragraph 683, tariff act of 1897, as "black oxide of tin" or "grain tin," but is dutiable under paragraph 183 as "metals unwrought, not specifically provided for."

DECORATIVE ETCHING ON SILVERWARE.

"A little learning is a dangerous thing;
Drink deep, else taste not of the decorative spring."

By A. F. Saunders.

I have often wondered why the art of etching is used so little in metal work, especially in silverware; evidently its decorative possibilities have either been overlooked or are not appreciated, for surely this art is worthy of just as high a place among the handicrafts as any other form of hand work. It possesses a quality and refinement all its own that should appeal strongly to good taste; its adaptability and simple method of application recommend it as an ideal medium in which to express any decorative design in metal work. Etching is used quite extensively for

ETCHED SILVER VASE.

inscriptions, scenic views, etc., on prize cups and trophies, but viewed from a purely aesthetic standpoint, such secondary use as this hardly does it justice and fails to express its true value.

Etching is no more costly to execute than chasing, engraving or any other hand work. I admit there is much silverware on the market that is called etched work, but in most cases it is rank imitation, usually die work. However, it is my purpose in this article to give an idea of the process and also the value of this effective hand work to the craftsman in metal.

We will use the illustrated silver vase as an example. To begin with two very important points must be remembered—first, the parts etched or eaten away must be absolutely clean; second, the design, if raised must be thoroughly covered with the etching paint or ground, the formula for which will be found further on. The object is first thoroughly cleaned with fine pumice and water, then dipped in the acid bath long enough to remove any oxide, thus giving it a smooth white surface to transfer the design upon. My method for this is tracing over the design previously drawn on thin paper that has been brushed over with rouge on its underside; this leaves a clear, clean outline for the filling in. Simple rather than complicated designs are most effective for this work. Care must be taken that the design is placed evenly and spaced properly. This is now filled in with paint, using a good grade water color brush (red

PRIZE TROPHY.

sable best), care being taken to get as smooth outline as possible and the paint laid on evenly. The design filled in is allowed to dry thoroughly, then with hot beeswax brush over the bottom, inside, or any parts not to be etched to protect them from the acid. The object can be suspended in the bath either by a waxed cord or stick of wood.

This acid bath for etching silver is nitric 2 parts, water 2 to 3 parts; keep work moving slowly to ensure even depth of eating away. As to the depth most effective experience only can teach the time required in the acid. I have found that as a rule with the above proportions of acid from 10 to 15 minutes is sufficient, watching the work carefully that none of the paint flakes off. When the required depth is reached wash carefully in clean water, dry thoroughly, then fill in with paint all the parts

etched away. When this is dry it is ready for the scratching or shading, which is done with different sized points made of an old rat tail file; these must not be too sharp, as the object is to simply scrape away the paint, not to dig into the metal. This is done by using the scratcher as a pen or pencil, drawing and shading the design effectively. Do not attempt to shade too much as the simpler and fewer lines the better the result when finished. It is now ready for the second etching. The shaded lines are etched just deep enough to show up plainly when the piece is finally oxidized. The paint is removed with turpentine and the wax melted off, and when thoroughly cleaned of all grease is ready for finishing and coloring. The effect reversed is most attractive, etching away the design thus giving a stencilled effect and leaving the ground raised.

Another attractive effect can be had by etching different parts of the motire different depths, giving the effect of one layer of ornament upon another; also with two different colored metals one can be etched away. For instance, the silver plate to the copper ground, leaving the design in silver or gold on silver, or brass on copper. The effects thus produced are beautiful. Raising parts of the etched work on a snarling iron or punch also adds to the variety and is most effective in some designs. This effect is shown in the illustration of the prize trophy, as in the border and panels around the bowl-shaped body; also the shield effect around base is done this way. In ending I give the ingredients of the etching paint I use also the necessary materials:

Paint or ground: Asphalt 3 parts, pure beeswax 1 part, turpentine enough to cover; bring to boil, mix thoroughly and allow to cool. Keep in well corked bottle and add turpentine occasionally. Caution must be exercised in the boiling process as it is highly inflammable, also must not allow it to burn. For waxing use only pure beeswax slightly colored with powdered rouge. This is melted back into the wax pot when etching is finished, so there is no waste. Old rat tail files ground to a point and inserted in wooden handles or wound with coarse cord make excellent scratchers; three are enough. For acid bath use 40 per cent. commercial nitric acid and clear water. Keep this bath at about 60° F. while etching. Turpentine removes the paints easily. On silver platinum oxidize is most effective to show up the etched work.

ALUMINUM MOVEMENTS

Some important contracts recently secured by the Aluminum Company of America were the wire terminals of the Southern Pacific Railroad at San Francisco, Cal. The railroad is electrifying a portion of its line and decided to use aluminum cables. The material will be shipped on or before the 1st of May. Another railroad secured by the company is the cable for the trolley road to Lake Winona, Wis., in which H. J. Heinz, the pickle king, is interested. Both of these orders were larger than the company had received for some months. They also report that the aluminum end of the automobile business is picking up. A new product of the company is bimetallic tubing, which is aluminum and steel, with an outer shell of aluminum and inner shell of steel or vice versa. The same combination with copper and aluminum. The company has been testing for some time the use of bimetallic aluminum tubing in condensers and reports that so far the tests have been very satisfactory. The Aluminum Company is now manufacturing aluminum tubing in a great variety of sizes larger than they have ever made before and are planning the erection of a new tube mill at New Kensington, Pa.

RECOVERY OF ZINC IN THE IRON BLAST FURNACE.

By Randolph Bolling.

Zinc ore occurs in southwest Virginia, associated with iron and lead at Austinville. The treatment of this ore at the smelter of the New River Mineral Company after removing the major portion of the lead and zinc left an iron concentrate commonly known as Austinville Roasted Concentrate, very rich in iron with an average analysis as follows: Dried at 212° F.

Moisture	11.20 %
Metallic iron	52.02 %
Silica	6.50 %
Lead	3.86 %
Zinc	6.38 %
Manganese	.78 %
Alumina	.28 %

These roasted concentrates were shipped to the blast furnace plant of the Virginia Iron, Coal & Coke Company, at Radford, Virginia, in the early part of 1900, and were mixed with the native brown limonite ores. About 40% roasted concentrates and 60% limonite ore composed the ore mixture. When the furnace was blown in on its first blast in December, 1900, the presence of Zinc in the ore mixture did not produce any troublesome manifestation. The blast furnace campaign went along on well ordered lines, with only occasional "freezes" of a day's or so duration, and produced an exceedingly high grade of foundry iron. With only a very small amount of pig iron was made other than No. 1 or No. 2 foundry. Owing to the money market conditions at this time it was deemed advisable to blow out the furnace by the management. The furnace, which was 75 feet high by 16 feet bosh with four Whitewell and four pass stones, was given a thorough cleaning. At the top of furnace a heavy ring of "cadmia" had formed in a compact, stony mass, which weighed about 100 tons, and which was removed with difficulty. The inside of the "dust catcher," underground flues and connections were lined with a beautiful sublimated deposit of "cadmia," varying from one-half to two inches in thickness, of a light gray color, with stalagtites and needles in some places. These accumulations were carefully removed and an average sample taken and analyzed by the writer with the following result:

Zinc oxide	83.38 %
Zinc sulphide	2.40 %
Zinc carbide	2.17 %
Ferric oxide	3.20 %
Calcium carbonate	3.39 %
Silica	1.75 %
Lead oxide	1.24 %
Sulphuric anhydride	2.00 %
Moisture	1.30 %
	100.83%

This material was shipped to zinc works at East St. Louis, Mo. The occurrence of "cadmia" is also peculiar to Virginia furnaces using ores of the Oriskany formation in and around Clifton Forge. The old charcoal stacks in this neighborhood all contained a zinc ring at the top which astute blast furnace managers of the coke blast furnaces now operating in this region had carefully removed and disposed of to zinc smelters. The more modern furnaces using the Oriskany ores usually find when the furnace is blown out that the sale of the cadmia brings about enough to cover the cost of relining the furnace. The cadmia is highly prized by the zinc works managers owing to the fact that it is remarkably free from lead and iron and al-

ways commands a higher price than zinc ore of the same metallic contents.

RUNNING A GOLD SOLUTION WITHOUT THE USE OF A GOLD ANODE.

By Geo. O. Thompson.

The writer believes that for certain classes of work where a uniform color is desired over a large surface, such as clock and lamp work often presents, the plater will find he can get better and more reliablie results without the anode than with it, providing his bath is rigged up in the following manner:

First procure a half barrel and place a few bricks in the bottom. Next get a porous jar made of unglazed earthenware; this is to contain the gold solution. Place the jar inside the barrel letting it rest squarely on the bricks. Now take a piece of sheet iron almost as deep as the barrel and long enough to encircle the porous pot; place this inside of the barrel. Connect the positive pole of your dynamo to the sheet iron by means of a wire; connect the negative pole to your switchboard and from thence to your cathode rod. Inside of the porous pot put your gold solution, and fill the space between the pot and the barrel with water in which dissolve about 2 ounces of cyanide to the gallon. It is very important that the gold solution inside the pot and the cyanide water inside the barrel be kept at the same level. In case the solution is desired warm, it is a simple matter to run a steam coil through the barrel.

It is hardly necessary for me to mention that in running a solution this way it is necessary to make frequent additions of gold in the form of chloride or fulminate in order to maintain the solution at its proper strength.

In Bolivia there is a fair demand for lamps and those of the hanging kind are very popular. The country depends almost entirely upon kerosene for lighting purposes, and manufactures utilizing this oil can be placed on the market.

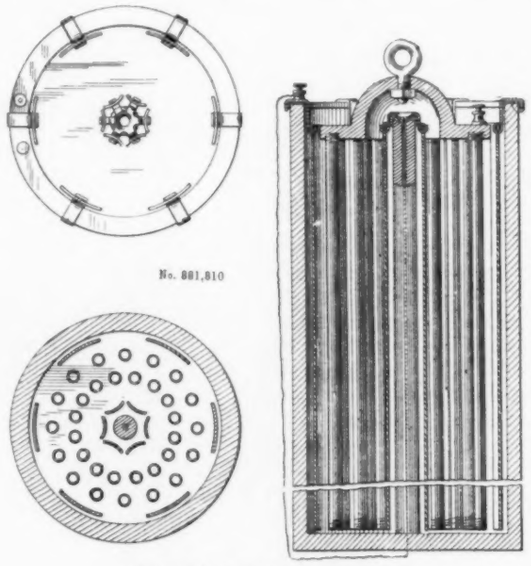
According to a recent Customs ruling jet beads are held dutiable as jewelry and as such must pay duty at the rate of 60 per cent. ad valorem. The importers claimed the beads were strung as a matter of convenience in handling and therefore should only pay 20 per cent. But it was shown they were strung on silk threads ornamented with a conventional design in silver wire.

The Pioneer Mail of Allahabad, British India, states that the development of the manganese industry in the Central Provinces has been very rapid, and with greater railway facilities even better results would have been obtained. No efforts are being made in India to smelt the manganese ore by the electrical process, which would greatly increase the profits of working by largely reducing railway and shipping charges. The Mail also states there are large bauxite deposits in the district which are being examined.

Professor Arnold, in a recent lecture at Sheffield University, England, showed, when dealing with brass, the value of the application of the science of metallurgy to practical problems connected with the mysterious failures in marine engineering. He took the case of the explosion of the brazed copper main steam pipe of the S.S. *Prodano,* which exploded off the Kentish Knock, at a pressure about one-tenth of that to which it had been previously tested. By the microscope and other means it was discovered that through electrolytic action the bilge water had transformed the brass into rotten spongy copper.

ELECTROPLATING APPARATUS.

The object of this apparatus, which has been patented by George A. Lutz, of New York city, and assigned to the American Circular Loom Company, of Portland, Me., is to provide means for the ready electroplating of a number of articles simultaneously. The tank is provided with means for suspending a plurality of anodes arranged



ELECTROPLATING APPARATUS.

in a plurality of series, so that one series of anodes is surrounded by another series. The anodes are all connected in a circuit and means are provided for simultaneously inserting the articles to be plated into the electrolyte in the space between the anodes.

A large number of articles may be attached to the cathode plate for simultaneous plating and removal from the bath. In this way articles of considerable length, such as iron pipes for electric conduits, may be plated. It is further stated that such articles may be galvanized in this apparatus by using zinc anodes.

Special American Agent A. B. Butman states that the State of Jalisco, Mexico, produces silver, copper, gold and lead. The mines are largely silver mines, which produce small amounts of gold, while the Autlan copper district is promising.

Last year Canada produced 2,016 tons of antimony ore, 57,381,746 pounds of copper, $8,264,765 worth of gold, 47,565,000 pounds of lead, 21,189,793 pounds of nickel, 12,750,044 ounces of silver. This is a large decrease in the gold production (over 28 per cent.) and represents a falling off in every district except Nova Scotia. The copper production increased about 3 per cent., while the output of nickel was a little less than in 1906.

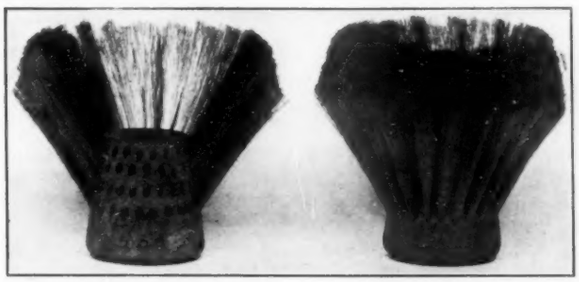
According to an article in the Mexican *Herald,* Mexico is now working the largest pearl farm in the world. It is situated in the Gulf of Lower California. Two years are required for the growth of an ordinary shell, which forms slowly in layers like an onion. Three distinct varieties of pearls are produced, the most valuable, black pearls, ranging in value from $300 per karat. The next in value are the white gems at about $250 per karat gold. These prices are only for the most perfect and rarest pearls.

INDUSTRIAL

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

NEW FINISHING BRUSH FOR HOLLOW WARE.

In the making of some forms of hollow ware it is difficult, with the ordinary forms of wire brushes, whether they be circular or bunched, to reach every part of the interior. Particularly is this true in shapes carrying beading or molding around or near the bottom. With a brush of the usual shape it is impossible to reach these parts, mainly because the wires of the



brush will roll and curl up into little bunches which destroy the efficiency of the brush.

In the new form of brush, which is here illustrated and which has been brought out by P. Mahler & Sons, of 299 Pearl street, New York City, all these objections are overcome. One engraving shows the brush cut away to convey an idea of the cone-shaped base to which the wires are attached. The wires thus rest in a diagonal position at an angle to the axis. It is very evident that when the brush is revolved at the high speed common in scratch brushing the wires are forced out by centrifugal force so as to touch every portion of the interior of the article, no matter what the shape may be. The result is a perfect and uniform finish over the whole surface. These brushes are placed on the market in many different sizes to suit hollow ware of all kinds.

IMPORTANT CONSOLIDATION.

The Bristol Company of Waterbury, Conn., has come under the control of Prof. William H. Bristol, whose inventions this company has been manufacturing since it was first organized in 1889. Prof. Bristol assumed active charge of the management of the business on March 28 and now owns the majority interest. The business, which has been carried on under the personal name of Wm. H. Bristol at New York, will hereafter be combined with the Bristol Company, and by this consolidation of interests the Bristol Company will now have probably the most complete line of recording instruments in the world for pressure, temperature, electricity and for a great variety of other applications.

The Bristol Company was organized in 1889 under the name of "Bristol's Manufacturing Company" to manufacture Bristol's pressure gauges and Bristol's steel belt lacing, for which Wm. H. Bristol had taken out patents. To these were added many other inventions from time to time and in 1894 the business was incorporated under the name of "The Bristol Company."

Two years ago Wm. H. Bristol withdrew from the presidency of the company and since that time has developed many new inventions, including the Wm. H. Bristol electric pyrometers and patented smoked chart recorders. The new pyrometers have come into wide use, there being for instance fifty of these pyrometers in service in one of the large steel plants.

The new lines of Wm. H. Bristol instruments supplement those of the Bristol Company, supplying varieties for applications for which the old instruments could not be recommended.

SOME REMARKS ON BASSITE.

The Bassite Mining and Smelting Company, of Cincinnati, Ohio, make the following announcement about their product, "Bassite," a discussion of the physical and chemical properties of which has been under discussion on the Criticism and Comment page of The Metal Industry. The company says:

"We must say that bassite answers the purpose of tin in the manufacture of first-class brass castings, with this exception and variation: It makes castings less rigid, but, on the other hand, tougher than when tin is used. For instance, used in what are termed government gun metal specifications, copper 88, tin 10, zinc 2, bassite will produce a metal having slightly less tensile strength and slightly less rigid but vastly tougher and better able to withstand continuous vibrations, shocks or jars than if tin were used.

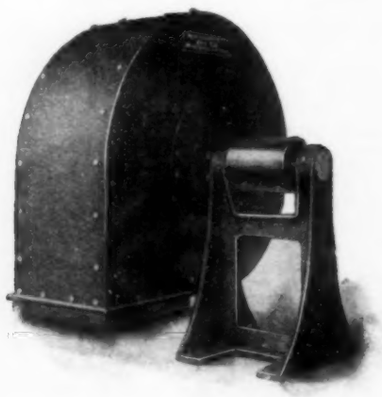
"Where gun metal specifications are used more for the purpose of producing a metal which is very strong and will not break, rather than to secure rigidity of gun metal, such metal made with bassite in place of tin will be better adapted to the purpose. Where rigidity and the toughness of the government gun metal specifications are desired it may be secured by using 4 to 6 lbs. of tin together with 4 to 6 lbs. of bassite in place of the usual 10 lbs. of tin in these specifications. This will make a most interesting metal of great durability and strength, which we have not yet seen reproduced by other processes.

In all other respects where tin is used in the manufacture of the ordinary run of first-class brass castings, if bassite be substituted for the tin, the results will be superior for the foundryman's purpose, as well as that for the trade, as the metal produced is dense, tight, close, non-porous of superior toughness and durability. Small and intricate castings can be poured with wonderful success by using bassite in place of tin.

"As regards chemical analysis, we assure you the merits of bassite cannot be determined by the same. Neither do we believe it can be done full justice by trying a very small portion of it in one small heat of 30 or 40 lbs., but if the foundryman will see fit to make off a few heats in a No. 40 or No. 50 crucible and watch the process in the heating, casting and finishing he should quickly determine whether or not, in conjunction with the price, he can use bassite advantageously in his foundry."

MASSACHUSETTS BALL BEARING EXHAUSTERS.

The ball bearing exhausters now being manufactured by the Massachusetts Fan Company, of Watertown, Mass., mark a distinct advance in fan blower design.



MASSACHUSETTS BALL BEARING EXHAUSTER.

The bearings, of the Chapman double ball type with single ball races, are made of case hardened cups forced into the hanger and case hardened cones forced on to tapered portions of the fan shaft. Between the two run hardened steel balls separated by small ball idlers carried

END VIEW WITH BALL RACES EXPOSED.

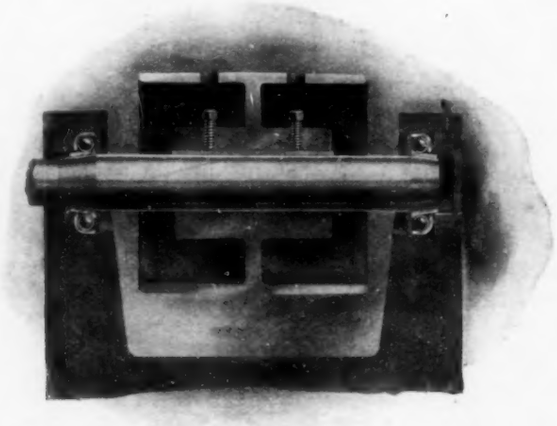
in light steel floats. The function of these floats is to keep the idlers in the centre line of the larger balls, while the idler balls themselves eliminate the destructive grinding action of the load balls. The shaft may be readily driven out through the fan wheel, pulley and bearings, the taper contact between shaft and inner sleeve thus being easily broken.

The bearings are packed in vaseline when shipped from the factory and require no attention whatever except a semi-annual repacking. In order to detect any defective parts each bearing is subjected to severe running load tests under pressures measured in tons. Such bearings have been run for months under various conditions without showing the slightest signs of wear or deterioration.

This advance type of fan possesses many important advantages over the older forms. In the smaller sizes the bearing supports form an inherent part of the hanger, making a very compact and rigid combination while insuring absolute alignment of the fan shaft. Freedom from the necessity and expense of oiling is also secured. Such fans may be placed in the most conspicuous place without collecting dirt and dust due to escaping oil. Journal friction has been almost entirely eliminated. If necessary, the different parts of the bearing may be readily disassembled for inspection or replacement. As a great and added advantage these fans in the smaller sizes are made universally convertible; that is, they may be adjusted to discharge in any direction. The purchase of an entirely new fan or even the change of hanger is thus obviated. These fans may be made either right or left hand or inverted without reference to the bearings, for which special oiling arrangements would be required in other types. The same hanger is used on both single and double exhausters.

Comparative tests definitely prove the superiority of the ball bearing fan over one fitted with plain babbitted bearings. A summary of such tests shows a decrease of about 10 per cent. in the requirement below that necessary with the older type. To provide against misleading results in these tests both fans were previously run for several weeks, so that they presented ordinary conditions. Such economy in favor of the ball bearing fan shows an approximate annual saving of 25 per cent. of the purchase price of the fan.

The convertible type, with bearings formed in the hanger and with overhung wheel, is made in sizes up to and including 60-inch diameter of shell. In larger sizes the ordinary form of casing construction is employed and the bearings are of necessity constructed as independent boxes to be bolted on to the supports. In the larger fans the bearings contain two ball races instead of one, as in the case of the smaller sizes. Two case hardened cups are forced back to back into a circular containing ring; a sleeve is placed at the middle, upon each end of which is



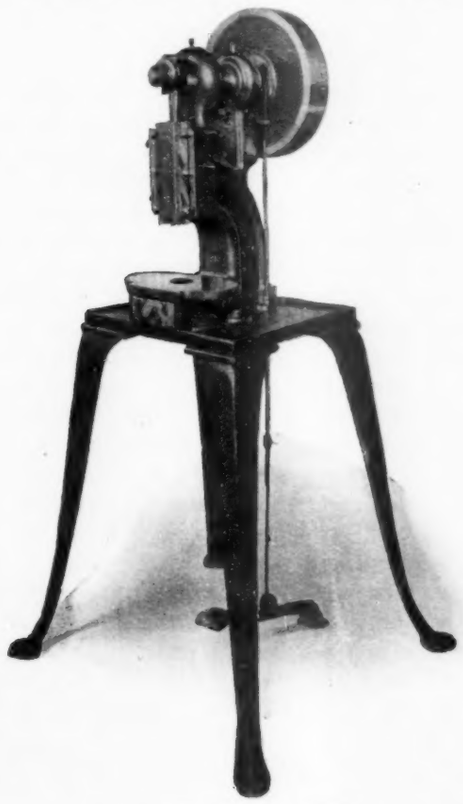
SECTION THROUGH DRIVING PULLEY.

forced a case hardened cone. The whole, including balls, is held on pivot centre of the ball and socket type, by which self-alignment is secured. The bearings, each of which is entirely independent of the fan, are bolted to cross-bars supported by angle iron uprights, both securely riveted to the fan sheet. The fan shaft is slipped through the sleeve. In both types the balls are thoroughly protected from dust by easily removable washers.

For the first nine months of 1907 the Transvaal's output of precious and base minerals was valued at $114,912,720, the share of gold being $101,273,015; diamonds, $9,690,515; coal, $2,907,750; silver, $338,615; other minerals, $704,825.

NEW POWER PRESS.

The Standard Machinery Company, of Providence, R. I., have brought out a new power press which is particularly designed for optical, hardware and jewelers' work and which is well adapted for all light classes of work. It is similar to their No. 1-C press and is fitted with long box slide and adjustable side gibs. The machine is equipped with the instantaneous patented Horton roller friction clutch which engages instantly, there being less than 1/32 inch travel of the periphery of the flywheel from the time the treadle is pressed until the clutch has taken hold. This mechanism is exceptionally strong, as there are several positive points which connect simultaneously, thereby giving a solid connection from the flywheel to the center of the crankshaft. All these clutches are provided with positive stop which provides a second stop from being made by releasing the treadle and again depressing it. In case it is desired to run the machine continuously the stop may be removed from the clutch, this being done by simply sliding out of position. The base of the press is made with an opening of any size ranging from ½ inch to 4½ inches. It is also provided with a small drawer to catch the work wren finished. All bearings are adjustable for wear, the slide having a particularly long bearing surface with adjustable side gibs, providing an accurate and easy adjustable alignment. The adjustment of the plunger is made by the eccentric with clamping collar. This adjustment, however, does not affect the length of the stroke, but is used for adjusting the slide for dies of different thicknesses.



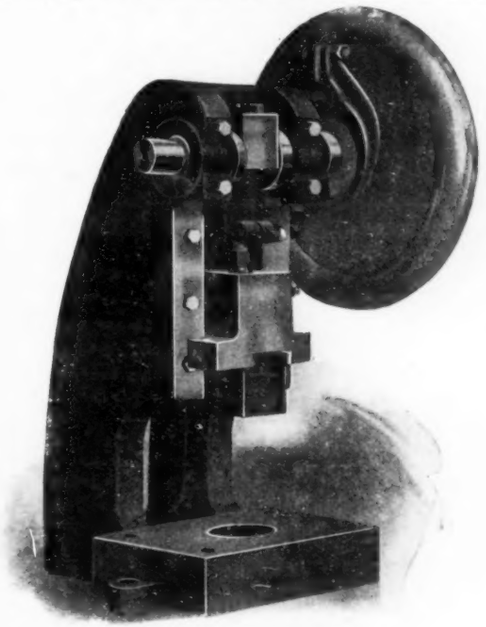
NEW POWER PRESS.

These machines are furnished either with table or without, and are often used as a bench press. The total weight of the machine with table is 300 lbs.; the weight of the balance wheel is 60 lbs., 14 in. diameter by 3 in. face. The regular stroke is 1 in., and by special request it can be made as large as 1½ in. The adjustment of stroke is ⅜ in., while the distance from slide to bolster with stroke up and adjustment down is 5½ ins. The distance from the center of the slide to back is 4 ins., while the distance between die bolt is 7¼ ins. The machines occupy floor space of 28 x 30 ins. and has an overall height of 4 ft. 9 in. The speed of the press is 300 R. P. M.

NEW BENCH POWER PRESS.

The Atlas Machine Company, of Waterbury, Conn., have designed the machine here illustrated to take the place of the ordinary foot press and to do light blanking, perforating, riveting, forming and closing operations. It is claimed it will do this work 25 per cent. quicker than a foot press and with absolute accuracy.

The frame of the machine is of the open back type, well webbed, and great care has been taken in the distribution of the metal to secure strength and stability. The bed is of generous proportions and is provided with standard V-shaped ways well gibbed, thereby insuring good alignment of punch and die. The connection between the gate and crank is of the ball and socket type and an adjustment of 1½ inches down is provided by means of screw and clamp sleeve. The gate is furnished plain or with projections for stripper attachments, as shown, and is provided with a dovetailed punch block, or is bored out for tapered punches. The shaft is turned from solid stock and made large and long in the bearings; it is extended beyond the left-hand side of the press to drive the slide or dial feeds, or other attachments.

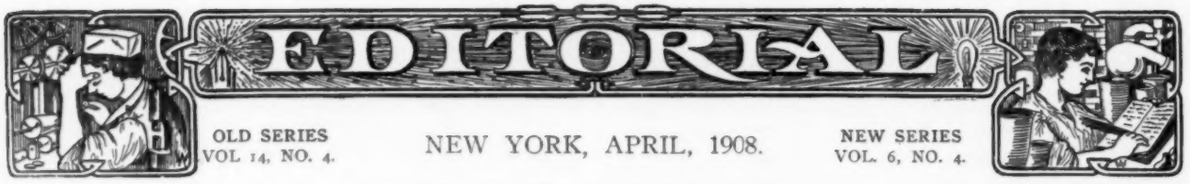


NEW BENCH POWER PRESS.

The clutch mechanism is so designed that when the foot treadle is depressed the shaft makes one revolution and automatically trips the clutch lever and stops, thus making it impossible to get more than one stroke of the gate by each depression of the treadle.

Either of two types of balance wheels are furnished; either the regulation belt rim wheel or the round hand wheel type, as shown, with a 9-inch pulley cast on the outer side. The latter type is considered by far the best as it is more convenient to handle in setting and trying tools; and it also prevents the head of the operator from coming in contact with the belt.

These machines are constructed with the same care and attention to details as in the building of an automatic machine.



OLD SERIES VOL. 14, NO. 4. NEW YORK, APRIL, 1908. NEW SERIES VOL. 6, NO. 4.

THE METAL INDUSTRY

THE CONSOLIDATION OF
THE ALUMINUM WORLD
THE BRASS FOUNDER AND FINISHER
ELECTRO-PLATERS' REVIEW
COPPER AND BRASS

Published Monthly by
The Metal Industry Publishing Company
(Incorporated)
61 BEEKMAN STREET, NEW YORK CITY
Telephone No. 4983 Beekman Cable Address, Metalustry

PALMER H. LANGDON, ... *Editor and Publisher*
S. D. V. BURR, ... *Managing Editor*
JOHN B. WOODWARD, ... *Director*

Subscription Price, $1.00 per year, postpaid to any part of the World.
Single copies, 10 cents.

ADVERTISING RATES ON APPLICATION

ENTERED FEBRUARY 10, 1903, AT NEW YORK, N. Y., AS SECOND CLASS MATTER UNDER ACT OF CONGRESS MARCH 3, 1879.

CONTENTS

THE DISTRIBUTION OF THE ROLLING MILLS.

The distribution of the metal rolling mills of the United States indicates how the manufacturers of brass and copper have followed the various industrial centers after the establishment of the industry in Connecticut some 100 years ago.

Of course, the first and foremost center of brass and copper activity has been and is the Naugatuck Valley, with the city of Waterbury, Conn., as its center. Here are located the greatest number and the largest mills, and additions and new mills are built year after year, despite the fact that about the only raw material of any account found in the State of Connecticut which is used in the manufacture of metals is chestnut wood. The industry has been founded, developed and expanded by the metallurgical and mechanical genius of the Connecticut Yankee, not from its nearness to the base of supplies. The establishment of the metal rolling mill industry in this section of the country has also brought a host of various metal goods manufacturers, or cutting-up shops, as they are known, and also many machinery builders to make the tools and machines required in all of the metal working factories; and that the works of all of these various manufacturers are still growing is evidenced by the records of improvements and expansions published in the last few years in these columns.

Leaving Connecticut, the metal rolling mill industry goes west almost in parallel lines. First comes the State of New York with plants in New York City, Hastings-on-the-Hudson, Rome and Buffalo, all representing large works with modern equipment and each having developed, or promising to develop, notably Rome and Buffalo, the usual subsidiary shops.

The next rolling mill center in the western advance is Detroit, though this jump from Buffalo to the City of Straits may be broken in the future by the establishment of a mill at Cleveland, O. Plans have been under way some time for the organization of a rolling mill company at this point, but they have not materialized and in the meantime Detroit has forged ahead, with two tremendous mills, a number of metal goods factories, and is the greatest brass foundry and finishing city of the country, having some extremely large works devoted to founding and finishing.

The last center west in the brass rolling mill industry is Kenosha, Wis., which has a notable plant, besides the usual number of metal goods shops. This, like the rest of the mill sites, is a growing center and promises further development. Besides the great brass and copper mills outlined above, there are scattered through the industrial section of the country a number of large mills

which roll copper only and many small mills which draw small-sized tubing and roll silver, lead and other metals. The copper mills are located mainly in New Bedford, Taunton, Belleville, N. J., Baltimore, Pittsburgh and Lisbon, O., and the small tube works and other mills are all in the States of Rhode Island, Connecticut, New York and New Jersey.

Besides the metal rolling mills mentioned there are the aluminum rolling and drawing mills located at different points in the States of Pennsylvania and New York.

Thus it is seen how closely the metal rolling mills have followed the industrial sections of New England and the Middle West and how thoroughly these industrial centers are equipped with plants to take care of the needs of the manufacturing community. The only industrial section of the country which has not yet been invaded is the Pacific Slope, and no doubt the growing metal needs of that section of the country will be sufficient at some distant day to make it profitable to establish a mill on the Pacific seaboard.

NO ONE OWNS NAVY'S SILVERWARE.

It has long been the custom to present each new vessel of the United States Navy, carrying the name of a city or State, with a token of some sort, useful, or ornamental, or both, or neither. In the main these gifts have been paid for by general contributions, and their presentations have been made occasions for much oratory and reciprocating good feelings.

Sixty-eight vessels now have gifts of this character, varying all the way in value from the $26,500 silver service for the "Pennsylvania" down to the $40 paid for the reading matter presented to the "Chattanooga." The gifts bear no relation whatever to the size of the vessels or to their fighting ability—battleships may be content with a little present, while those of less displacement but more friends may take pride in elaborate and costly specimens of the silversmith's art. It all seems to depend upon the energy and begging ability of the promoters in each case, or upon the liberality of politicians in the handling of public funds.

It is right and proper that our war vessels should have articles of this kind and our only regret is that all are not supplied with first class libraries and complete services of gold and of silver, so that all could eat and drink and—calm their brains by quiet perusal of the best in literature.

But it now seems a great wrong is to be righted. The loving cup presented by the descendents of Admiral Bailey to the "Bailey" does not belong to the ship; the silver service given by the citizens of Indiana is not owned by the battleship of that name; the punch bowl on the "Mayflower," indicative of the good will of the Russian Peace Commission, together with the library on the "Kansas" from the Kansas Society, are not the property of those ships; the inhabitants on and in the "Topeka" can render thanks to the accompaniment of an organ donated by the Women's Army and Navy League, but they could not give a clear bill of sale. And so on all the way through the list. These articles on the vessels of the navy have no legal owners, either ashore or afloat.

We suppose sea lawyers and those of like ilk would judge this to be "abandoned property," and therefore the property of any one capable and mean enough to take it. If any of it were stolen and the thief caught, how could he be prosecuted and who would bring the charge? The rightful owners brought the gifts to the ships and there presented them to those having no authority to accept them; technically the articles were merely left on board. Of course the promise was made by those to whom they did not belong to "cherish" them and to always hold the donors in "grateful remembrance," but no receipt was or could have been passed.

Now all this is very embarrassing; but soon the inconvenience, not to say trouble, is to be quickly corrected, as above remarked. The House of Representatives is now considering an act which has been passed by the Senate, authorizing the Secretary of the Navy to accept and care for libraries, silver services, and like material, presented to the vessels of the navy. The act provides: "That the Secretary of the Navy is hereby authorized to accept and care for such gifts in the form of silver, colors, books or other articles of equipment or furniture as, in accordance with custom, may be presented to vessels of the navy by States, municipalities or otherwise. The necessary expense incident to the care and preservation of gifts of this character which have been or may hereafter be accepted shall be defrayed from the appropriation 'equipment of vessels.'"

As soon as this act becomes law the responsibility for the gifts will rest upon the head of the navy. He will be accountable for the safety of the silver and gold, books and musical instruments, but he will not be permitted to enjoy the pleasure of their use except for so long as he may hold his job.

ALUMINUM IMPORTATIONS?

Statements have been widely circulated through the press that large quantities of aluminum have been imported into this country from England. These reports carefully explain that trade of this character is possible because the price of the metal abroad is so much lower than here that it could be profitably imported even against the high duty of 8 cents per pound. An effort to chase these rumors to some reliable source failed to develop anything substantial; aluminum from England has not been heard of in the trade, but there is a large quantity of scrap metal which may have been confused with importations from across the water. The story appears to be similar with those which are thrust forward quite frequently about some largely capitalized company which has acquired a water power somewhere, and knows where to get plenty of bauxite, and expects to start right in producing the metal, and, incidentally, smashing the market.

CRITICISM AND COMMENT

WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ALL ARTICLES PUBLISHED IN THE METAL INDUSTRY. SUGGESTIONS WELCOME.

VAPOR GALVANIZING, SHERARDIZING AND COWPERIZING.

To the Editor of THE METAL INDUSTRY:

A brief reply to Mr. Sherard Cowper Coles' letter of February 22nd seems to me in order, if only to correct two slight errors.

In the first place, Mr. Coles seems slightly "piqued" at the brief mention of "Cowperizing" and the way in which I introduce it. This process is, in my opinion, for practical purposes, so overshadowed by Mr. Coles' older process of Sherardizing that it suffers by comparison. In my previous etxended paper on the "Art of Galvanizing," read before the American Foundrymen's Association, I did my best to do justice to Mr. Coles for his very valuable contributions to the art of protecting metals with zinc. However, as I am sailing for Europe within two or three days, I hope to mend this slight breach by personal contact with Mr. Coles.

In the second place, I was not aware that I ever used an oil film on the object to be vapor galvanized, excepting in an early experiment. As Mr. Coles states, the oil would be vaporized under the conditions of his own process. As for the low temperature factor, I acknowledge that it is one of the factors of Sherardizing and the reason why zinc-dust is valuable in the processes employing it.

As to the alloying of zinc to *cold* iron, I maintain it as a fact. In certain experiments traces of zinc were found at a depth of about 1/16 of an inch below the surface of objects made of good iron; this is all the more surprising because, as furnacemen know, the best temperature of condensation for zinc lies around 400° C. and below 350° the zinc will condense as a powder. With steel, even mild steel, I have found the amount of alloying in a cold state quite inconsiderable.

The conditions required for "brassing" copper, as mentioned by Mr. Coles, will not give a zinc deposit, hence Mr. Coles' failure to repeat the experiment; furthermore, such considerations as the composition of the retort and the amount of dilution and direction of motion of the zinc vapor are of prime importance. I have heard of people trying the experiment of vapor galvanizing with a test-tube; if these people will try distilling spelter from zinc oxide in a piece of porcelain combustion tube, they will have equal success, but it will not put the zinc smelters out of business. Vapor galvanizing from zinc-dust is nothing more than distillation of zinc at low temperatures, and its application to the specific purpose of galvanizing. It is not ready for the market and I do not claim for it, at the present time, any value beyond that of a very promising line of investigation, and the further I proceed in that investigation the more I feel convinced that it will find a great many applications, especially in cases where none of the older processes can be used. The main difficulties to be overcome are *identically* the same as in the manufacture of spelter.

As I stated in the paper referred to, vapor galvanizing is not new; it is even perhaps older than the Chambeyron Patent. In the same way, the practice of coating objects with finely divided metals, with carbon present, is older than Sherardizing; cow bells made in America have been brass-coated by this process for many years.

I acknowledge that Mr. Coles is correct when he condemns my official treatment of the question of air being present; I am accumulating increased respect for this important factor, especially since I found that I could not use, as a reducing agent, that wonderful product known as natural gas with its 1,000 odd B. T. U.s and its reputed cheapness without passing it through Pyro. and KOH to get rid of the air which is so generously pumped into it—and the price went up last autumn.

Pittsburg, Pa., March 21, 1908. ALFRED SANG.

PART PLAYED BY MANGANESE IN COPPER ALLOYS.

To the Editor of THE METAL INDUSTRY:

As there seems to be an impression among brass founders that the only object in using manganese in making manganese bronze is to have it act as a carrier in getting the iron into the copper, I take this opportunity of informing you that I have learned by experience that such is not the case, as from many tests made of tensile strength of manganese bronze alloys without iron, I find that uniformly higher tests and elastic limits can be secured without the iron than with.

The manganese bronze of commerce is an evolution from Thurston's maixmum tin, copper, zinc alloy. In the manganese bronze that was first put on the market in the '80's by Parsons & Dick, iron was a constituent. At that time the only cheap way of securing manganese, as I was told by Mr. Alexander Dick, was to melt copper under a layer of molten ferro manganese. The copper would take up a certain per cent. of iron and manganese. It was this copper-manganese that they were compelled to use in the manufacture of Parsons' manganese bronze and delta metal.

Since that time manganese copper has been made in the electric furnace by the Electric Smelting & Aluminum Co., at Lockport, N. Y., using pure manganese oxide as the source of manganese, the manganese copper so made being practically free from iron and other impurities.

A large number of experiments made at the above works since then developed the two facts: First, that the presence of iron was a detriment and, secondly, that the addition of aluminum highly benefited these alloys. As a result of this, patent No. 415,832 was granted to the writer for the addition of aluminum to a metal of this nature, and for many years an alloy containing nearly 4% of manganese and free from iron has been made and marketed by the above concern. They have found that the increased percentage of manganese enables the securing of better results than the small fraction of a per cent. that is sometimes used in the so-called manganese bronze. ALFRED H. COWLES.

Lockport, N. Y., March 26, 1908.

THE ENGINEERING DIGEST, formerly known as the Technical Literature, is published monthly by the Technical Literature Company, 220 Broadway, New York City. It was found that the old title failed completely to convey any idea of the scope of the journal. This misapprehension arose from the fact that it is devoted to live subjects, those of current interest, and is not concerned merely with the literature of those subjects. The Technical Press Index, a most important department of the paper, will be increased in scope to include more of the foreign publications and society transactions.

CORRESPONDENCE

IN THIS DEPARTMENT WE WILL ANSWER QUESTIONS RELATING TO THE NON-FERROUS METALS AND ALLOYS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

METALLURGICAL.

Q.—I will ask that you inform me the mixture of metal used in the manufacture of clock ornaments, etc. I wish to use this for casting purposes instead of a mixture of lead and antimony.

A.—The majority of concerns casting novelty goods who do not use the lead and antimony mixture use Bertha spelter, adding about ½ to 1 per cent. aluminum. This is the best casting zinc obtainable, although New Jersey spelter, alloyed in the same manner, gives excellent results.—C. P.

Q.—(1) Is there any well established rule governing the electrolytic action of metals; for instance, having given the electrical resistance of two metals or alloys, can we determine whether one will cause the other to be corroded in acid or saline solutions, and if so which will be corroded. (2) Should an alloy which resists the action of sea water well, also resist sulphuric and hydrochloric acid solutions. (3) Will the addition of 1-10 of 1 per cent. of aluminum reduce the electrical conductivity of a brass composed of 82 per cent. copper, 18 per cent. zinc, to any extent. If possible give the electrical conductivity of this brass, containing 1-10 per cent. of aluminum, considering pure copper as 100 per cent.

A.—(1)The metals are grouped into an electrochemical series, which may be found in any general chemical text book. The theory is that any metal in the series will chemically replace all the metals that follow it and be replaced by all the metals that precede it in the series. (2) Free sulphuric or hydrochloric acid will corrode alloys more readily than sea water. For instance, manganese bronze is practically non-corrosive in sea water, but is attacked by mine water. (3) The addition of 1-10 of 1 per cent. of aluminum will not reduce the conductivity of an 82 per cent. copper, 18 per cent. zinc alloy appreciably, but the addition of aluminum is not recommended. On remelting your gates you will get spongy castings full of oxide and scruff. An alloy of copper 80, zinc 18 and tin 2, gives a conductivity of 28.26 as compared with copper at 100, and is preferable to the one you mention, running better, being stiffer and machining better.—J. L. J.

Q.—We want a non-corrosive white metal alloy suitable for high grade valve and fittings castings, in which it is desirable to obtain something superior, from the sanitary standpoint, than the ordinary brass and bronze metals used for such purposes. A metal that will take and retain a fine finish matching well with nickel plate would be most suitable. The matter of price per pound is not an important consideration within reasonable limits. What we desire above all is a non-corrosive close grained white metal that will not impart any taint to steam or water coming in contact with it; a metal that will machine freely, have the required strength and retain a finish matching nickel.

A.—Monel metal, Grade A, meets most of the conditions named. It is a by-product from the refining of nickel-copper matte; contains about 70 per cent. nickel, and is comparatively cheap. It has been used successfully for the valves of gas engines, etc. The metal may be had in ingot form or castings, from Isaac G. Johnson & Co., Spuyten Duyvil, New York City.—J. L. J.

Q.—We would like you to publish the method of manufacturing ordinary phosphor copper.

A.—Ordinary phosphor copper is supposed to contain 5 per cent. of phosphorus. It is made by melting the copper (which may be scrap wire) in a crucible or Schwartz furnace at a low heat and adding the phosphorus by means of a phosphorizer. About 7 pounds of phosphorus must be used to each 100 pounds of copper, as there is an unavoidable loss of phosphorus. Care must be observed in handling phosphorus as it causes very dangerous burns.—J. L. J.

Q.—We would like to know what will make zinc soft and pliable and stop shrinkage. We want to avoid shrinkage cracks when casting this metal in iron molds.

A.—The purer a zinc is the softer and tougher it will be. This is the reason why Horsehead and other high grade zincs are used in the galvanizing of iron wire which has to be soft and pliable and withstand bending. Zinc is usually alloyed for casting in iron molds as the alloy runs better and has less shrinkage.

Zinc	75	parts
Tin	15	"
Copper	5	"
Aluminum	5	"

This is a good mixture for this purpose.—J. L. J.

Q.—Can you publish a formula for manganese bronze? Can manganenese bronze scrap be remelted and used as other metals without adding alloys to the mixture? If it is necessary to add alloys for ordinary purposes, what is generally used and how used? We have not cast any of this metal in our foundry and we would like to know if we can work manganese scrap to advantage and be able to furnish castings of the same nature that the metal was originally.

A.—It is best to buy your manganese bronze ingot from a reliable maker, but if you wish to experiment with making it yourself you might try the following formula:

Copper	56	lbs.
Zinc dross	42½	"
Tin	¾	"
Aluminum	½	"
Ferro-manganese	¼	"

A mixture of ⅔ new ingot and ⅓ scrap can be used successfully without adding anything to it. If the scrap is rather light and is used alone, 1½ pounds of zinc and 1 ounce of aluminum may be added to each 100 pounds of it, but it does not improve it very much. The use of very fine scrap or turnings usually results in black, brittle castings which are not acceptable, as the majority of customers want "gold colored" castings. It is best to sell your turnings, and they are worth about one-half of the market price of copper or perhaps a little less. They can be used up a little at a time in cheap car brasses,

but most founders will not touch them at any price as they are only worth the value of the copper content and can only be used to advantage by the copper smelter—J. L. J.

Q.—Our specialty is yellow brass chandelier castings, and at the present time we are experiencing considerable trouble with our cock and key castings. The general fault is that our customers claim they are entirely too hard or too tough, and that they do not machine freely. So far we have failed to get a perfect turning yellow brass.

A.—Referring to above we would advise that all brass mixtures are tough, and hence cannot be expected to machine freely. They are not hard, however, unless considerable tin is added. Pouring hot will make the castings machine more freely. The following mixture is about as satisfactory as can be recommended:

Copper	70	parts
Zinc	26	"
Tin	2	"
Lead	2	"

This will perhaps answer your requirements.—J. L. J.

MECHANICAL.

A.—How can the length of a cross belt be determined when the distance between the centers of the shafts and the diameters of the pulleys are known?

A.—A very accurate rule for determining the length of a cross belt is the following: Multiply the sum of the radii by 3.14. To the product add twice the distance between the centers and the square of the sum of the radii and divide by the distance between the centers of the pulleys. For example, the pulleys mentioned in your question have a diameter of 24 and 48 inches and the distance between the centers is 18 feet, or 216 inches. Following the rule we have $48 \div 2 = 24$ inches, the radius of the large pulley, and $24 \div 2 = 12$, the radius of the small pulley. Now $24 + 12 = 36$, the sum of the radii of both pulleys, $36 \times 3.14 = 113.04$, and $18' \times 12'' = 216$ inches, and $216 \times 2 = 432$ inches, which is twice the distance between centers. The sum of the radii squared equals $36 \times 36 = 1296$. This divided by the distance between the centers of the pulleys equals $1296 \div 216 = 6$ inches. Adding the three results together we obtain $113.04 + 432 + 6 = 551.04$ inches; $551.04 \div 12 = 45.9$ feet, the length of the cross belt.—E. W.

CHEMICAL.

Q.—Enclosed please find sample piece of brass plated steel. Can you tell me how to make it more yellow in appearance?

A.—It appears to us your brass solution is deficient in copper. We would advise you to add more copper in the regular manner, or until the solution produces nearly a bronze color. Dissolve 1 part of carbonate of zinc in 3 or 4 parts of strong water ammonia (26 Baume) and add just a little to bring up the color. By regulating your brass solution in this way you will be able always to maintain a good color. The frequent cause of trouble in brass baths is that there is not sufficient copper in the solution, although they produce a fairly good color.—C. P.

Q.—Kindly state through the columns of your paper why it is when tumbled iron goods are brass plated they are almost as bright as before plating; but if they are first struck with copper they get a dull color. On the other hand, if we brass plate them first and put copper on top of that and then again brass plate them, they stay bright.

A.—You are no doubt well aware that copper solutions do not deposit their metal as bright as brass solutions; therefore the deposit is of a dullish color in the beginning, and naturally the articles when placed in the brass bath partake of this dull aspect. The brass bath deposits brighter; therefore the flash deposit is brighter and causes the iron surface to become a better conductor when replaced in the copper bath. The deposit then occurs much quicker. Many platers are taking advantage of this method because brighter deposits can be obtained. A little hyposulphite of soda dissolved in water and added in the proportion of 1 to 2 ounces in each gallon of solution materially brightens the copper deposit. C. P.

Q.—I would like to get the finish on the piece of work I send you; I want to know how to plate the same and how the stripping is done.

A.—The finish upon the sample is produced in the following manner: Silver plate and oxidize in the regular sulphuret of potassium solution, using the solution warm to produce a good black. Now make a good concentrated solution of cyanide of potassium and get a piece of stiff Spanish or other felt, made into the shape of a pencil brush. Moisten the felt slightly with the cyanide solution and remove the oxide in spots, the same as the sample. The shell is now sand blasted or the effect may be produced by a satin finish swing scratch brush. Afterward lacquer with a satin dip lacquer and dry out in the usual way.—C. P.

Q.—I would like to know how aluminum parts may be oxidized or darkened. I am using a large number of these parts in connection with the manufacture of firearms and I desire to darken them in some way.

A.—In the July, 1907, number of THE METAL INDUSTRY, page 203, you will find a short article entitled "To Produce Black Upon Aluminum," by Charles H. Proctor. This may interest you.—C. P.

Q.—Will you kindly give us some information regarding the etching of brass by the electric method?

A.—Electro-etching is accomplished in the following manner: Prepare a 3 to 5 per cent. solution of nitric acid in water. Arrange this as a plating bath with three poles; connect the center pole with the positive current; the outside poles to the negative current, and connect to these poles thin sheets of aluminum the length and depth of the solution in use. Prepare your surface for etching in the regular manner; use a current strength of 3 to 4 voltss. Copper, brass, silver and bronze may be eached in this bath. For gold aqua regia of the same density should be used. Aluminum is not soluble in nitric acid, so in etching silver pure nitrate is formed in the solution.—C. P.

Q.—I would like to know a good pickle which is inexpensive, and which will clean up brass and copper tubes.

A.—Try using at 10 or 15 per cent. solution of hot muriatic acid. This will remove the oxide quickly and give you a cleaner surface.—C. P.

Q.—I have about 100 pounds of copper stringing wire which has been used in silver plating. It is my desire to use the copper for another purpose, so will you kindly publish an acid strip that will not injure the copper.

A.—Prepare an acid dip as follows: Oil of vitriol 1 quart and aqua fortis 4 ounces. Heat the acid in a regular acid jar on a water bath and place your copper stringing wires in until tre silver has been disssolved. This strip does not affect copper if it is kept free from water. If the strip works slow a little more aqua fortis may be added, but should not exceed 32 ounces to a gallon of vitriol.

Q.—We have a nickel solution, composed of nickel salts, to which the apprentice boy added sulphuric acid. We put in soda to kill the acid. The bath still acts in a very peculiar way, plating in spots and very dark.

A.—You made a great mistake in adding soda to neutralize the free acid. Carbonate of nickel or water ammonia is the remedy for free acid. Try your solution with blue litmus paper; if the paper reddens quickly, add a little water ammonia until a slight purplish color is obtained. Then add 1 or 2 ounces single sulphate of nickel to each gallon of solution. The peculiar deposit and dark spots are probably due to the addition of the soda, forming with the acid sodium sulphate, which produces dark spots, especially if the solution is alkaline. If an addition is made of the single sulphate of nickel your solution will gradually recover its normal condition.—C. P.

Q.—I am in need of a green gold solution.

A.—To produce a green gold deposit the following formula may be used:—

Cyanide of potassium	14 ounces
Chloride of gold	5 ounces
Chloride of silver	1½ ounces
Water	5 gallons

or use 3¾ troy ounces of pure gold and 1¼ ounces pure silver and reduce to chloride in the usual manner. The solution should be used at about 80 degrees. Anodes of platinum or carbon may be used, but the alloyed anodes give the best results and keep the solution permanent in metal. Such anodes should consist of gold 3 parts and silver 1 part. For producing dark green tones dissolve 1 ounce white arsenic and 2 ounces caustic soda in 8 ounces hot water; add a few drops to each gallon of green gold solution according to the tone desired. A strong current is necessary for depositing, not less than 5 or 6 volts.—C. P.

Q.—I have a 150-gallon solution in which I hang 14 square feet of molds, the same being wax mixed with black lead. My dynamo is about 75 feet from the tank. I oil the molds, then brush lightly all over with copper bronze, and in about 40 hours have a deposit heavy enough for a picture frame. The designs are birds, flowers and animals with very fine lines which must be brought out. Now what I want to know is which is the best, bronze powder or black lead?

A.—We are of the opinion that if you obtain an extremely fine copper bronze powder and follow the methods you have outlined above you can obtain the best possible results; we also think this will give you finer lines than the black lead process. In electrotyping, the fineness of the graphite plays an important part. When the graphite surface is prepared the molds are placed in a concentrated solution of sulphate of copper; this is placed in shallow trays and finely powdered iron dust is sprinkled upon the surface. This causes a deposit of copper to take place in the same manner as when iron is immersed in a dilute acid sulphat bath. The molds are afterwards placed in the regular bath and the operations finished.

Q.—I have an order for a number of brass belt buckles in butterfly shape, to be finished in variegated colors to represent the natural coloring.

A.—Dissolve 1 ounce of acetate of lead and 3 or 4 ounces of caustic soda in each gallon of water. Rig up like a plating bath using a weak current. Connect the bath so the positive or anode pole will be in the center, in the same manner as the regular negative or work pole. Cleanse the buckles and flash them in the regular nickel solution. Now wash and immerse in the lead solution. Use a flexible copper wire about 18 gage, bent in any shape at the end, and move it in front of the buckles as rapidly as possible. n a few seconds the articles will be covered with beautiful irridescent colors. Remove, wash and dry out carefully. If very plain the articles may be lightly buffed on a canton flannel wheel; afterward lacquer by dipping.—C. P.

Q.—We have steel pieces to be plated with platinum; kindly give us the process.

A.—Prepare a solution as follows: 7 pennyweights of chloride of platinum are dissolved in 1 pint of water to which is added 2½ ounces of 50 per cent. phosphoric acid and ammonia. This will produce a yellow precipitate of phosphate of ammonia and platinum. Do not filter. The solution should be alkaline to red litmus paper. Now dissolve 8½ ounces of phosphate of soda in another pint of water and mix the two together. The solution is now boiled until the odor of ammonia has disappeared and the solution becomes clear. Replace the water lost by evaporation. Use the solution at the boiling point with a platinum anode and a current strength of 6 volts. Articles of steel should first be coated with nickel; brass or copper can be platinum plated direct. The above bath gives excellent results.—C. P.

Q.—We want a statuary bronze finish.

A.—For a statuary bronze finish upon brass or bronze proceed as follows: Polish and clean your work in the regular manner; then copper plate it for 15 minutes or more; then scratch brush. Now prepare a solution consisting of ¼ to ½ ounce of liver of sulphur to a gallon of water. Use this solution cold. Add a few drops of water ammonia. Then immerse your coppered articles in the solution for a few seconds; remove, wash and dry out in sawdust. Then scratch brush dry if the tone is not dark enough. Prepare a second solution about half the strength and give a quick dip. Wash and dry out without further brushing; then lacquer in the ordinary way. Various tones can be produced by varying the strength of the solution and the number of immersions.—C. P.

Q.—Why does my copper peel on iron and steel, while it does not peel on brass and zinc?

A.—Your solution contains too much free cyanide; add a little more plastic carbonate of copper, or you may use any other copper compound. Then add 2 ounces bisulphate of soda to each gallon in use. This should be added at the close of the day's work and the bath thoroughly stirred up and allowed to settle until the following morning.—C. P.

METALLURGICAL DIGEST

A REVIEW OF METALLURGICAL MATTERS OF THE WORLD.

TRANSLATED AND EDITED BY IRVING LANGMUIR, MET. E., Ph.D.

ALUMINUM SOLDER.

A method of soldering aluminum and alloys containing aluminum has been patented by Kupper's Metallwerke, Bonn, Germany. The clean surfaces to be joined are coated with a flux consisting of ammonium stearate, made by adding 30 to 40 parts of ammonia to 100 parts of molten stearic acid. The solder (90% of tin and 10% of copper) is next applied separately to each surface, and these are then soldered together either with the same or with any other suitable solder. The solder and flux may also be powdered, mixed together and then applied to each of the surfaces separately.

THE STUDY OF BINARY ALLOYS.

German, Russian and French investigators have been devoting more and more energy to the scientific study of binary alloys. In most cases they seek to prove the existence or non-existence of compounds of the two metals in question and to study the properties of these compounds. The cooling curve method is usually employed. This consists in preparing small samples of alloys of known composition from the two metals and allowing them to cool slowly in the crucible. A thermocouple or thermometer placed in the molten alloy indicates the temperature at each instant. A curve is drawn from the data obtained by plotting the temperature of the cooling alloy vertically and the time horizontally. The slope of the curve indicates the rate of cooling and naturally the temperature at which solidification takes place is shown on the curve by a nearby horizontal portion of the curve, for during the freezing of the alloy the temperature remains constant. In a similar way any other change taking place in the physical or chemical state of the cooling mass is indicated by a change in the direction of the curve.

In the study of the alloys formed from any pair of metals a great many such cooling curves are made, sometimes over a hundred; and then by combining these results much valuable information is obtained. In particular the melting point of all alloys of the two metals can be predicted and also the question as to the existence and composition of any chemical compounds between the metals is definitely settled. The fact that a compound has a higher melting point than a mixture of substances serves as a basis for the solution of the latter question.

In some cases the investigations include a study of the physical properties of the alloys prepared, and it is only in such cases that the investigations can be of any immediate technical application. Such papers as these will be reported from time to time in these columns.

The amount of data on alloys accumulated during the last few years has become so vast that a tendency is now developing to generalize and to trace more closely the connection between the physical properties such as hardness, strength, density, electric conductivity, etc., and the diagrams obtained by the cooling curve method.* When more progress has been made along these new lines there will be a way opened by which all the study of these binary alloys may be applied with great benefit to the needs of the metal industry.

However, our most valuable alloys will probably never be binary alloys but rather those containing three or more constituents. It is therefore an encouraging sign to observe that several papers have recently been published on ternary alloys. Unfortunately progress along these lines must necessarily be rather slow, because a study of a ternary alloy is very much more complicated than that of a binary alloy, and it cannot be undertaken until the three sets of binary alloys that can be formed from the three metals have been thoroughly investigated.

Prof. Tammann, of the University of Göttingen, has been among the foremost of the investigators of alloys, and the amount of work that has been turned out in his laboratory during the last decade is truly surprising.†

The world is indeed fortunate that the Germans have the zeal and patience to carry out this vast work. Although the quantity of purely scientific work on alloys that has been done by Americans is as yet relatively small, yet it has been of the highest quality. We may hope that in a few years, when the new science of the study of alloys has been further developed, the Americans will be in the lead in finding practical applications.

*For example, L. Guillet has recently published a series of articles in the *Comptes Rendues* on the relations of the brittleness and malleability of binary alloys to the results obtained by the study of the cooling curves.

CALCIUM.

Arthur E. Pratt, in a paper in the Chemical News,* vol. 96, page 100, gives some interesting information about the metal calcium, which is now being manufactured on a fairly large scale in Germany, but which lacks for the present any very important applications. According to Mr. Pratt calcium can be sublimed *in vacuo* between 700° and 800°c. It melts at 800°c. Alloyed with other pure metals, calcium causes brittleness, crystallization and hardness. The atomic volume (i. e., the atomic weight divided by the specific gravity) of calcium is 25.4, an unusually high value, thus confirming Roberts-Austen's observation that the presence of metals of high atomic volume leads to the deterioration of the physical properties of metals of low atomic volume.

Calcium may be used as a reducing agent and in the refining of metals. "In the latter case it acts in three distinct ways: (1) By reducing oxides and sulphides, (2) by eliminating dissolved gases, (3) by forming compounds with certain impurities, thus rendering them less deleterious. All three modes of action are strikingly shown in the case of copper." The alloys with copper have not given promise of commercial utility.

MICRO-STRUCTURE LEAD-ANTIMONY ALLOYS.

A valuable paper on the hardness and micro-structure of lead-antimony alloys by A. Shaposhnikov and J. Kanevsky has appeared in the Journal of the Russian Physical-Chemical Society, vol. 39, page 901 (1907) (abstracted in Chemical Abstracts, vol. 2, page 64). The practical value of the alloys of lead and antimony is due to the fact that by the addition of antimony to lead the latter retains its plasticity, while its hardness is greatly increased. The hardness of different alloys was determined by measuring the dimension of indentations produced by pressing a steel ball against their surfaces by a pressure of a definite magnitude. In order to have all the alloys of the same temper they were prepared in open molds, heated to 200°c. and then slowly cooled.

The following table gives some of the results:

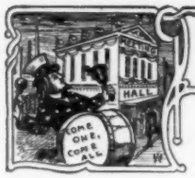
Per cent. of antimony...	0	4	8.3	13	17	20	45	74	100
Relative hardness	4.3	8	12.0	17.7	13.2	15.9	18.7	21.2	39.8

The addition of small quantities of antimony greatly increases the hardness of lead. Up to 5-6% antimony the increase in hardness is proportional to the amount of antimony. The hardness reaches a relative maximum at 13% antimony (the eutectic alloy with melting point 228°c.), a relative minimum at 17% and then gradually grows to the hardness of pure antimony. Antimony and lead form no chemical compounds with each other.

According to L. Sempell (Metallurgie *4*, 667-670, 1907) an alloy consisting of 91.7% of aluminum and 7.6% of copper makes a bearing metal showing very much better wearing qualities than the antimony-tin-copper alloys usually used. It is claimed that the new alloy costs only about 1-6 of the ordinary bearing metals.

†Most of this work has been published in the *Zeitschrift für anorganische Chemie*. Abstracts of all such articles now appear in *Chemical Abstracts*, published by the American Chemical Society.

*See also Chemical Abstracts, vol. 2, page 33.



Associations and Societies

REPORTS OF THE PROCEEDINGS OF THE METAL TRADES ORGANIZATIONS.

AMERICAN BRASS FOUNDERS' ASSOCIATION.—President, Charles J. Caley, New Britain, Conn.; secretary, Andrew M. Fairlie, McCays, Tenn.; treasurer, John H. Sheeler, Philadelphia, Pa. The object of the association is purely education, and is accomplished by the collection of such information as will be of benefit to the members and to general shop practice; by the presentation of papers on appropriate subjects, and by the publication of such literature.

The following new members have recently joined the association: Jos. P. Cleal, Toronto, Canada; Murray Woodbridge, Toronto, Canada; Harry Dreyfus, New York, N. Y.; Haines, Jones & Cadbury, Philadelphia, Pa.; Ellwood Ivins, Philadelphia, Pa.; W. A. Porter, Toronto, Canada.

The program for the Toronto convention, June 8-12, is assuming definite shape, and will comprise papers by prominent members on live subjects of interest to the various industries represented in the association.

As the same rule which governed the entertainment of members only at the Philadelphia convention of the American Foundrymen's Association will be strictly followed out at Toronto, those intending to apply for membership are urged to do so at once. While admission to the sessions of the association, as well as to the exhibits, is free to all, membership in the association will admit also to the social features of the convention provided by the entertainment committee, which, on the provisional program, include a smoker, a trolley ride, and a moonlight excursion on the lake.

The annual dues are but $5.00. Send in your application to the secretary, Andrew M. Fairlie, McCays, Tenn. The benefits to be derived are well worth the money expended. Write to the secretary for application blank and a copy of the constitution.

AMERICAN FOUNDRYMEN'S ASSOCIATION.—President, Stanley G. Flagg, Jr., Stanley G. Flagg & Company, Philadelphia, Pa.; secretary-treasurer, Richard Moldenke, Watchung, N. J. At the annual convention, held in June, an opportunity is given for interchange of thought on foundry practice. The objects of the association are entirely educational. Foundry information is desseminated to the membership and the trade at large. Original investigations are made to disclose the reason for difficulties. Committees do valuable work in the way of standardizing foundry practice. The next convention will be held in Toronto, the second week in June.

Under date of March 26 Dr. Moldenke, secretary of the association, made the following report:

Your secretary begs to report that active preparation for the Toronto Convention are now under way. The local Executive Committee, with our vice-president for Canada, L. L. Anthes, as chairman, are doing their utmost to make the occasion a memorable one in the annals of our association, as well as an international courtesy on the part of Canada to the foundrymen of the United States.

The magnificent working exhibits now in preparation, will be installed in the several exposition buildings provided by the municipality, and it is expected that the lieutenant governor of Ontaria will open this, the first American exposition on Canadian soil.

The dignitaries of the city will receive us with the hospitality our Northern brethren are noted for, and the beautiful city will be wide open, with a welcome for all.

A radical change from the usual programme for the meetings is contemplated at this convention. Instead of the reading of elaborate papers, there will be a return to original principles, live subjects being discussed, so that our members and their interested friends may have the value of the experience of others along their own lines. We have a few of these subjects selected and the promise of able speakers to introduce them systematically. We, however, want more material, and urge our friends to send in as soon as possible the questions of special interest to them which they would like to see discussed. We will then try to arrange for experts in these matters to take up the subjects for presentation. In this way, it is hoped, especially as the convention meetings will be held in an entirely separate and admirable building, that the greatest value will be given our members.

It is expected that all foundry Canada will be there, and from present indications for the American side, the enormous attendance at Philadelphia promises to be eclipsed. Toronto will be well able to care for all who come.

The provisional programme, subject to change, is as follows:

MONDAY MORNING, JUNE 8.—Exhibition will be ready.

MONDAY EVENING.—Meeting of the Associated Foundry Foremen.

TUESDAY AFTERNOON, JUNE 9.—Formal opening of the convention and exhibition. Joint meeting of the American Foundrymen's Association, American Brass Founders' Association, Associated Foundry Foremen, and Foundry Supply Association.

TUESDAY EVENING.—Official reception at the City Hall.

WEDNESDAY MORNING, JUNE 10.—Exhibition closed during this session. Business session of the association. Brass Association will hold meetings in separate building.

WEDNESDAY AFTERNOON.—Business session.

WEDNESDAY EVENING.—Left open.

THURSDAY MORNING, JULY 11.—Exhibition closed during this session. Business session.

THURSDAY AFTERNOON.—Business session.

THURSDAY EVENING.—Moonlight excursion on the lake.

FRIDAY AFTERNOON, JUNE 12.—Trolley ride.

FRIDAY EVENING.—Smoker.

A Ladies' Reception Committee will see that the visiting ladies are well cared for and entertained. Automobile rides, shopping expeditions, and theatre parties are on the programme for their especial delectation.

As the same rule which governed the entertainment of members only at Philadelphia will be strictly followed out at Toronto, members are urged to get their foundry friends to join the association. The annual dues are but $5, an insignificant sum in comparison with the information derived from the visit. The sessions of the association are free to all, as also the exhibition, but we would like to have all our foundrymen join the association and thus help carry on the good work of utilizing the iron and fuel resources of this continent to the best possible advantage in our particular line of industrial endeavor.

A further special invitation goes out to our British and German, as well as our European friends, who may happen to be visiting here. They will be gladly welcomed and cared for on making themselves known to the secretary. Furthermore, visits to the excellent plants of Toronto and other large Canadian cities will be arranged for on notification by foundrymen specially interested.

Come and be with us at Toronto, and learn what a wonderful country they have up in the North.

Watchung, N. J. RICHARD MOLDENKE,
Secretary

NEW ENGLAND MANUFACTURING JEWELERS' AND SILVERSMITHS' ASSOCIATION.—President, Harry Cutler; vice presidents, Theodore W. Foster, Providence, R. I.; Albert A. Bushee, Attleboro, Mass.; George K. Webster, North Attleboro, Mass.; treasurer, Harry M. Mays, George W. Dover Company, Providence, R. I.; secretary, Everett L. Spencer, Providence, R. I. The winter banquet is held the third Friday in February and the summer outing on the third Friday in June. The annual meeting is in October. The association is organized for the purpose of engaging in the business of fostering, encouraging and promoting closer social and business relations among its members.

ITEMS OF INTEREST TO THE INDIVIDUAL.

Some brass men are noted for being enthusiastic yachtsmen, but F. A. Taylor, of Waterbury, Conn., has gone them all one better, by his interest in submarines.

G. W. Peck, of the Peck Drop Press Works, New Haven, Conn., recently made a Western trip to see what progress the West was making in the use of drop presses.

F. H. Chamberlin, president and manager of the J. D. Smith Foundry Supply Company, Cleveland, Ohio, has been confined at his home from illness during the past month.

The following are the officers of J. A. & S. W. Granbery, manufacturing jewelers of East Orange, N. J.: J. A. Granbery, president; P. J. Coffey, secretary; S. W. Granbery, treasurer, and A. O. Burgess, foreman.

Alfred Sang, vice president of the Garland Nut & Rivet Company, of Pittsburg, Pa., and inventor of a galvanizing process, sailed for Europe on March 25. He will visit France and England, remaining abroad seven weeks.

A. W. Erdman, general superintendent, and his brother, E. F. R. Erdman, assistant superintendent of the Randolph & Clowes Company, of Waterbury, Conn., have resigned their positions. No announcement has been made as yet of their successors.

A. A. Butler, who was formerly a salesman with the Rome Brass & Copper Company for many years, has been engaged by the Detroit Copper and Brass Rolling Mills, of Detroit, Mich., and has been placed in their Boston office at 26 Union street.

Lewis E. Fulton, assistant treasurer of the Waterbury Farrel Foundry & Machine Company, of Waterbury, Conn., has been traveling in Europe for a number of months and will return to America on or before May 1. He has visited England, France, Germany and Austria, traveling in the interest of the company.

Mr. Parsons, the veteran manager of the Providence (R. I.) store of the Waterbury Brass Company, thinks that the tide of business is on the rise and that before many months buyers will again be complaining about the delay in getting material. He, therefore, believes it a wise policy to place orders before the rush begins.

William H. Donner has been elected vice-president of the Westinghouse Machine Company in the place of E. E. Keller, who retires. An official bulletin announces that the new vice-president will be in "direct responsible charge of all activities." This company has been out of the hands of a receiver for only a few days.

Henry Zacks, who has been representing the firm of B. A. Zacks & Son, dealers in metals, Erie, Pa., has been admitted to the firm, which will hereafter be known as B. A. Zacks & Sons. The firm have completed and moved into their new yards and warehouses, at Twentieth and Ash streets, where they have more than doubled their capacity. They have otherwise increased their facilities for the rapid and economical handling of various grades of stock.

At the annual election of the New York Metal Exchange, held on Monday, March 30, 1908, the following officials were elected: For president, P. R. Jennings, of Bruce & Cook; vice president, Morton B. Smith, of the Morton B. Smith Company; treasurer, Robert L. Crooke, of Robert L. Crooke. For the board of managers: B. Hochschild, of American Metal Co., Limited; H. W. Hendricks, of Hendricks Bros.; L. Vogelstein, of L. Vogelstein & Co.; G. E. Behr, of Behr & Steiner; Paul Koning, of Paul Koning; George W. Jaques, of Geo. W. Jaques; Emil Baerwald, of Emil Baerwald; A. B. Hall, of National Lead Co.

A SUPERINTENDENTS' REUNION.

What might be termed a Benedict & Burnham Superintendents Reunion was held on Saturday, March 28, when a number of Waterbury, Conn., men visited C. S. Morse and F. J. Loomis, of Yonkers, N. Y., inspected the new tube mill at Hastings-on-the-Hudson and had dinner in New York in the evening. Some years ago the party were all employees of the Benedict & Burnham Manufacturing Company, of Waterbury, occupying the following positions: C. S. Morse, general superintendent; F. J. Loomis, chief engineer; F. W. French, superintendent tube mill; W. H. Fray, superintendent of the wire mill; Frank P. Welton, superintendent of the casting shop; J. W. Pilling, superintendent of the rolling mill. It was, therefore, decided to have the trip and dinner mentioned and talk over the old rolling mill days.

Since their former connections the different members of the party have all remained in the brass business, but have become interested in other enterprises. C. S. Morse is now general superintendent of the National Conduit & Cable Company, of Hastings-on-the-Hudson, and F. J. Loomis is chief engineer of the same plant. F. W. French has a tube mill of his own at Waterbury and W. H. Fray is the leading spirit in the Fray Manufacturing Company of Bridgeport. Frank P. Welton is one of the incorporators of the Waterbury Rolling Mills, of Waterbury, and is looking after the casting end in that concern, and J. W. Pilling has a brass mill of his own at Waterbury.

DEATHS.

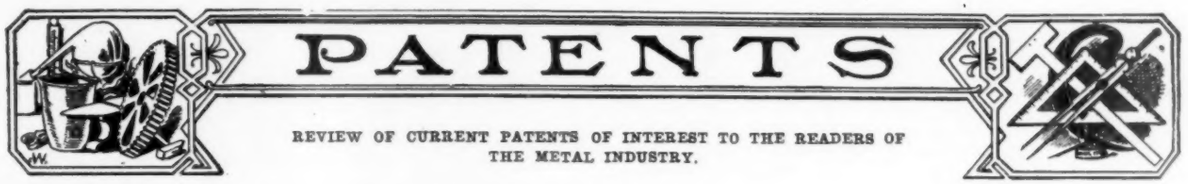
John Eastwood, president of the Eastwood Wire & Chemical Manufacturing Company, of Belleville, N. J., died at St. Augustine, Fla., on March 24. Mr. Eastwood was in his 89th year. He started in business at Belleville in 1847, establishing a small plant for the manufacture of liquor used in setting colors in silk. Later he went into the wire weaving business.

Hamilton Craig, 80 years of age, a well known former business man of Pittsburg, Pa., died at his home on March 26. Mr. Craig was born in Pittsburg and after receiving a public school education moved to Frankfort, Ky., in 1850, where he was appointed superintendent of the city gas and water works. Later he returned to the city of his birth and established the plumbing and brass foundry business of Craig Brothers, and until the consolidation of the firm with the Bailey-Farrel Manufacturing Company, in 1883, was the senior member of the concern. About ten years ago Mr. Craig retired from business.

Albert Charles Wittnauer, president of the A. Wittnauer Company, 9 Maiden Lane, New York city, manufacturers and importers of Swiss watches, and who resided at 46 East Thirty-first street, died at Mentone, in the south of France, on March 25, in his 52d year. Mr. Wittnauer came to this country from Switzerland as a young man of 18, and started immediately in business as an importer of Swiss watches. The venture proved very successful, especially with Jurgenssen watches, which became popular with business men. During the last five years he spent the greater portion of his time in Geneva, where he had business relations with leading manufacturers.

William Wallace Stevens, one of the prominent business men of Portland, Me., died at his late residence, in that city, on March 15. Mr. Stevens was a descendant of the first pioneers and was born in the Deering district June 18, 1828. He was

educated in the Deering schools and graduated from the Westbrook Seminary. After completing his studies he engaged in the iron business and for many years was a member of N. P. Richardson & Company, owners of the largest iron foundry east of New York. He continued with this concern until 1866, when the entire establishment was destroyed by fire. He then organized the Westbrook Britannia Company, with which he remained associated until about 15 years ago when he retired from business. Mr. Stevens is survived by a widow, one son and one daughter.



878,238. February 4, 1908. Metallic Packing. George D. Rollins, Philadelphia, Pa. This packing is so constructed as to be especially adapted for the piston and valve rods of engines.

880,871. March 3, 1908. Holder for Soldering Irons. John M. Fell, assignor to the Western Electric Company, of Chicago, Ill. In this invention a wire is wound into a cylindrical coil and attached to a base. The coil is locked to the base, and forms a holder for the iron.

878,064. February 4, 1908. Molding Machine. Fred Herbert Birtley, England. This machine is practically continuous in operation when once started. The mold is homogeneous throughout and the sand is compressed to uniform density throughout the entire length of the mold.

879,118. February 11, 1908. Molding Machine. John A. Rathbone and John T. Crossley, Utica, N. Y. In this machine the sand within the mold flask is compressed between opposed heads, one or both of which are provided with pattern faces. During the compression operation it is possible to place chaplets for supporting cores, chills, etc.

881,689. March 10, 1908. Gem Setting. Richard K. Hohmann, San Diego, Cal. By this method of setting gems, they may be removed and replaced without special tools and without straightening the claws. The upper ends of the claws are bent inwardly in the usual manner. Against the under side of the gem bears a member which is held in place by a ring screwing into the bottom of the opening.

878,471. February 4, 1908. Sand Molding Machine. Willis C. Swift, Hindsdale, Ill. In this invention one mold is being formed in one flask while another flask is receiving the sand, so that as rapidly as the mold forming devices complete their work of forming a mold, the flask containing the finished mold may be removed and replaced in working position, with reference to the mold forming devices, with another.

878,182. February 4, 1908. Soldering Appliance. Charles C. Blake, Brookline, Mass. This invention has special reference to the construction of the flexible tube containing a soldering flux in the form of a fluid or paste commonly used in connection with the soldering process. The new flexible tube has a spout which may be detached in order to prevent burning the same when placed near the metal being soldered.

881,583. March 10, 1908. Jewelry Polishing Device. Curtis H. Hodgins, Attleboro, Mass. This relates to polishing devices adapted for use in polishing and burnishing jewelry and similar small objects while they are immersed in a suitable cleansing solution. The receptacle is rotated in the bath, thereby subjecting the articles to a tumbling and rolling action, which exposes every part of the surface to the polishing medium.

880,695. March 3, 1908. Hood for Emery, Polishing, or Buffing Wheels. George V. Schnell, Troy, O. This hood is so designed that it may be adjusted to conform to the character of the work so that all the dust will be caught and conveyed to the suction pipe. In addition the hood may be easily removed to permit the changing of wheels. It may also be adjusted to act as a damper to cut off a suction of air in the suction pipe.

879,596. February 18, 1908. Reclaiming Tin Scrap. Elmer A. Sperry, Brooklyn, N. Y. This invention consists in so handling the scrap that the full values of both the tin and iron may be realized. To this end the values are first concentrated, and then each of the ingredients is treated to fit it for the market. The tin concentrates are put through various processes of treatment calculated to bring out to the very fullest extent their values.

878,840. February 11, 1908. Metal Annealing Furnace. Richard H. Ward, Youngstown, O. The invention contemplates a practical improvement in furnace construction for metal annealing whereby the process of annealing may be carried out with great facility and uniform results obtained. To carry out this idea the furnace structure is equipped with a permanent inner closed annealing oven arranged in an effective way in relation to the furnace walls and to the heat circulation, whereby the best results are obtained.

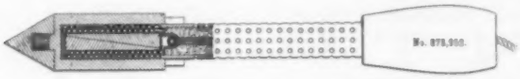
878,290. February 4, 1908. Wire Annealing Furnace. HarryB. Humphrey, assigner to Humphrey & Sons, of Joliet, Ill. After wire has left the drawing block it is usually passed through an annealing furnace for the purpose of rendering it pliable. The object of the present invention is to overcome the objections to the furnaces as now constructed by providing each pair of wire holes with a roller properly positioned to receive and discharge the wire in a line with the wire holes with which it cooperates, and to provide for the cooling and lubricating of the rollers.

868,979. October 22, 1907. Molding Machine. Frederick J. Geehring, Philadelphia, Pa. This relates to a novel construction of molding machine in which a reversible drop plate and stripping plate are employed whereby it is possible to reduce to a minimum the time essential for the production of a satisfactory casting. The device may be arranged to produce any kind or contour of pipe fitting. The flasks are hinged together and furnished with suitable means for locking them in assembled position. The reversible drop and stripping plates are adapted to be secured in such a manner that they are always in proper alignment with the parts coacting therewith.

883,098. March 24, 1908. Machine for Cleaning and Polishing Tin. Bradford H. Divine, Utica, N. Y. This invention provides a machine for cleaning and polishing tin in the final stages of manufacture. A particular feature of the machine is the means provided for cleaning the rolls continuously during the regular operation of the machine, so that they are kept always in the most efficient condition, and the wear and tear on them is minimized. The machine removes the residue of palm oil, lime and sawdust or bran, used in the final operations of tinning, and at the same time polishes the surface.

881,170. March 10, 1908. Process for Working Metals. Stanislas Zietarski, Newark, N. J. This process, especially in the manufacture of copper vessels such as kettles, employs a rolling rather than a hammering or spinning operation. The movement of the metal between the rollers is continuous and the metal is easily guided into shape while it is thus being rolled. This is claimed to be a great saving of time over former methods of this nature where the movement was reciprocating. It is stated that metal or alloys which would not submit to the hammering process can be handled by the new method.

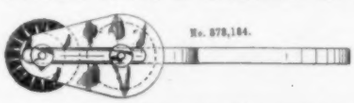
878,952. February 11, 1908. ELECTRICALLY HEATED SOLDERING IRON. Harry Hertzberg and Maurice J. Wohl, of New York City, assignors to Abbot Augustus Low, of Horseshoe, N. Y. In this soldering iron means are employed for electrically heating a mass of metal to a required temperature. The device is kept in



service with a minimum consumption of current. The new feature in the invention is a means for securing good mechanical contact between a mass of heat absorbing metal and an electrically operated heater or resistance, the latter being inclosed with the mass of metal.

873,897. December 17, 1907. MACHINE FOR WELDING COPPER. George Rosenberry, Harrisburg, Pa. In this machine the welding is affected by pressure instead of hammer strokes. The parts to be welded are heated a little over a cherry red and the ends are then dipped in a suitable solution and again placed over the fire until they reach what is known as a goldish sweat. When the metal has reached this stage it is ready to be welded and the parts are placed in the vise or hammer part of the machine and pressed together by the operation of a lever. When the two ends adhere to each other the metal is removed from the vise and again dipped into the solution, where it is held about five minutes, which completes the weld.

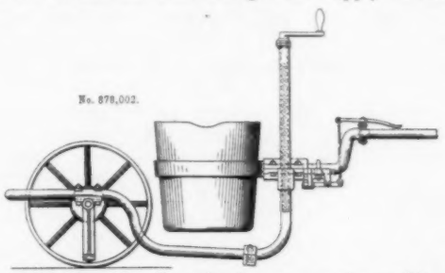
878,184. February 4, 1908. APPARATUS FOR APPLYING RIBBON GOLD LEAF AND THE LIKE. Georg Braunlein, Nuremberg, Germany. This invention relates to mechanism for applying gold



leaf or like material to surfaces for the purpose of decoration, etc. In this device there is a brush adapted to engage the ribbon so as to apply the same to the surface to be treated. The construction will be understood from the acompanying drawing.

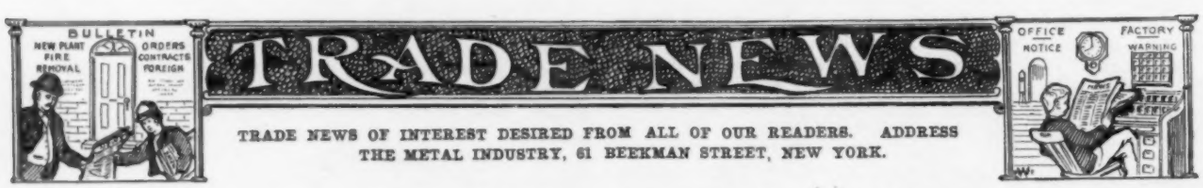
879,102. February 11, 1908. SAND BLAST APPARATUS. John F. Hay, assignor to the Erie Malleable Iron Company, of Erie, Pa. In the usual construction a sand pipe is arranged at right angles to a horizontal air pipe and the mingled sand and air are conveyed to the point of use. The present inventor has found that a deflecting partition at the outlet of the sand passage will effect a more even delivery of sand to the blast than with the usual construction. It has also been found advantageous to mingle the sand and air adjacent to the nozzle, this giving a more satisfactory control than where the sand is carried long distances by the air.

878,002. February 4, 1908. LADLE CARRIER. Clarence H. Imboden and John J. Lawler, Greensburg, Pa. In iron, brass and steel foundries it has been the usual custom to melt the metal in a furnace and distribute it to the molds in ladles carried by a crane or trolley where large ladles are employed. But this invention provides a ladle barrow which is light and durable and by means of which one man can get his supply of metal from



the furnace and by wheeling the barrow to the molds can pour the molds without assistance. This permits one man to handle a great amount of metal and the metal is poured hotter and in a better condition.

878,092. February 4, 1908. APPARATUS FOR MANUFACTURING METAL TUBES. Arnold Schwieger, Berlin, Germany. In this invention the mandrel which serves to perforate the metal bar is fastened to the mandrel rod which passes through the hollow main piston and the auxiliary piston, in such a manner that, after having perforated the metal bar, the mandrel is drawn back a little, and during the forward movement of the main piston it is moved forward therewith in checked motion. This forward movement is affected by two racks at the rear prolongation of the mandrel rod with whose alternately placed teeth engages a double toothed wheel, which is connected through levers with the draw-bars which move the cross head guide of the main press piston. After the tube has been pressed, the mandrel rod and the mandrel can be drawn back into normal position, after the driving mechanism for the racks has been put out of gear.



TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

The Bannatyne Watch Company, of Waterbury, Conn., have started to manufacture watches, their factory now employing 75 hands.

Samuel Butter & Co. are now settled in their new warehouse at 285 Commercial street, Boston, Mass. Their smelting works are still at South Braintree, Mass.

Of an amount of $60,000 recently expended for Government naval fittings, F. H. Lovell & Co., of Arlington, N. J., were awarded contracts aggregating $30,000.

Wm. B. Speirs, a die sinker and steel letter cutter, of 602 Buchanan street, Detroit, Mich., is about to start in business and will shortly erect a new building of his own.

The Eastern office of the Hawley Down Draft Furnace Company, manufacturers of the Schwartz furnace, have been moved from 149 Broadway to 42 Broadway, New York.

The New York Gas Fixture Company, located on Fifty-second street, between Tenth and Eleventh avenues, New York city, have recently been organized for the manufacture of gas and electric fixtures.

The Nelson-Brinkman Company, Sixth avenue, South and Fifth street, Minneapolis, Minn., who are electroplaters employing twenty people, are now selling platers' and polishers' supplies.

E. A. Fargo & Company, metal goods manufacturers, of Taunton, Mass., report that their business for February, 1908, was larger than that of February, 1907, which is a remarkable showing, considering present trade conditions.

The Waterbury Wire Die Company, of Waterbury, Conn., reports that they are exporting their diamond dies to Europe, despite the fact that all of the diamonds for the manufacture of these dies are bought in the European market.

The American Tube Works, of Boston, Mass., have finished their shipping building at Somerville, Mass., where their plant is located and the new building takes the place of an old mill. It is built of brick with a steel frame and a flat monitor roof.

The Hawley Down Draft Furnace Company, manufacturers of the Schwartz metal melting and refining furnaces, have moved their New York office from 149 Broadway to Room 1738, No. 42 Broadway. F. E. Ringer, the treasurer of the company, is in charge.

The International Silver Company have bought the plant of the Higbie & Barbour Manufacturing Company, of Brooklyn, N. Y., and it will be officially known in the future as part of Factory A. The Higbie and Barbour plant employed about thirty men.

Hill, Clarke & Co., of 156 Oliver street, Boston, Mass., have put in their machinery salesrooms a demonstration plant where they have twelve types of machines in operation. Buyers of machinery can see what the various kinds of machines will do in finishing metals.

E. P. Reichhelm & Co., 24 John street, New York, are advertising their sand blasts for use with either foot bellows or pressure blowers. They report that they are in a position to fill all orders promptly, having doubled their manufacturing facilities during the past year.

The firm of Andrews & Co. have taken the Providence, R. I., end of the business of the Cornell-Andrews Company, gold and silver smelters, refiners and assayers, with offices at 23 Mathewson street. The business of the Cornell-Andrews Company is now entirely at Meriden, Conn.

Geo. G. Prentice & Co., New Haven, Conn., manufacturers of automatic turret lathes, report that they have not caught up with their orders as yet, though business has no been as brisk the last few months. Their lathes are now sold by Manning, Maxwell & Moore, of New York.

The Progressive Metal & Refining Company, with offices at 610 Majestic Building, and works at 57 Third street, Milwaukee, Wis., announce the opening of their new plant for the manufacture of red and yellow brass ingots. They are in the market for light brass and brass turnings.

The De Vean Manufacturing Company, Eighteenth street, above Eighth avenue, Brooklyn, N. Y., with Charles Anth, secretary, have established a factory for the purpose of manufacturing telephones. The plant is equipped with modern machinery and a plating room and starts with every prospect of success.

Silver solder for brazing is the specialty of J. M. Ney & Co., of Hartford, Conn. They announce that their solder is easy flowing and reliable and they can furnish it in any quantity or size at rock bottom figures. Quotations are cheerfully furnished on request. The firm also manufacture alloys of precious metals for all purposes.

A workman of a Detroit rolling mill who, when he was leaving the shop acted as if he was heavily loaded, was stopped by the superintendent, searched, and 58 pounds of scrap were found in his clothing. This is only one of the many cases of how manufacturers are losing metal by the dishonesty of some of their employees.

The Dixon Manufacturing Company, E. B. Rich, manager, are the successors of the Lock Manufacturing Company, and are now located at 470 Seventeenth street, Brooklyn, N. Y. The firm manufacture ornamental automatic banks. They recently had a fire in their building, but are starting up again with many new appliances. They have a plating department.

The Taunton Crucible Company, of Taunton, Mass., recently shipped a carload of retorts to Monterey, Mexico. The Taunton company report that they are the largest manufacturers of retorts in the United States. They kept an account of the life of their products in one plant through 1907 and the records showed an average of 53½ charges per retort.

The Pilling Brass Company, of Waterbury, Conn., are rolling zinc in ribbons 1/1000 of an inch thin and can roll this thinness 4 inches wide. The material is used for electrical purposes. The Pilling Brass Company manufacture special sizes of brass and besides zinc are rolling brass, German silver, copper and phosphor bronze to the thinness of 1/1000 of an inch.

The firm of Axtell-McKee Manufacturing Company, manufacturers of standard and monitor wind mills, pump jacks, pipe fittings, gasoline engines, etc., of Fort Worth, Texas, have changed their name to the Axtell Company. The officers of the company are: F. W. Axtell, president; W. G. Newby, vice-president; J. D. Vroom, treasurer, and J. M. Axtell, secretary.

The F. B. Shuster Company, of New Haven, Conn., report that they have lately received a good lot of inquiries. The inquiries were good with them even during the dull times, but they have been particularly brisk of late. Manufacturers seem to be interested in getting prices and particulars about machinery that they may have the facts before them for future reference.

The Waterbury Manufacturing Company, of Waterbury, Conn., makers of brass goods, do not at the present time contemplate making any additions to their plant. But it is probable, as business is now dull and orders slack, that they will take the occasion to replace some of the older buildings of the plant with more modern structures, such as the latest buildings erected.

Ellwood Ivins Tube Works, makers of seamless steel tubing, with mills and general offices at Oak Lane Station, Philadelphia, have recently opened an office at 315 Chamber of Commerce Bldg., Chicago, to look after their Western business. They will continue their established New York office at 487 Broadway, and their English branch at 13 Southampton street, London.

The New Era Lustre Company's reward contest to platers closes on May 1. As mentioned in THE METAL INDUSTRY, the company offers $15 for the best sample of work finished with either their Brilliant, AA1 or No. 2 Brush Lacquer, and $10 for a sample finished with any other lacquer which excels the New Era goods. The company's office and works are at New Haven, Conn.

The New Method Stove Company, of Mansfield, O., have been running almost all the time during the financial depression and are now employing their usual number of men. The company manufacture gas ranges, heaters and hot plates, brass castings, etc. Steel and all raw material are purchased, but everything tht enters into the construction of their goods they make and finish themselves.

The new plant of the Paige Retort & Crucible Company, of Taunton, Mass., is finished and they have begun to manufacture crucibles and retorts. The plant is 100 x 65, three stories and a basement, which is suitable for storing raw materials. The factory is located on high ground and Mr. Paige, the manager, reports they have put in the best and latest machinery and will be in a position to promptly fill all orders.

The firm of Vennderbeck & Clase, Providence, R. I., who have been manufacturers of rolled gold plate for some time, have been preparing to manufacture small sized tubing. They have recently secured the arbors, having the rest of the necessary machinery, and will begin soon to draw tubing. Their factory has been running eight hours during the past few weeks and they could even run ten, as business is picking up with them.

William Voss, of 143 Harman street, Brooklyn, N. Y., has become an expert in metalizing plaster of paris, and recently visited THE METAL INDUSTRY office, where he showed some of his latest work in statuettes of bronze, copper and gun metal finishes. The work was so well done that it was difficult to distinguish them from similar castings of solid metal. Mr. Voss is open to engagement for doing the work or for engaging with a firm who desires to manufacture this class of goods.

The S. Obermayer Co. has opened a warehouse at 1604 North Broadway, St. Louis, with C. M. Barker, one of the best known foundry supply men in the West, in charge. Mr. Barker, as

representative of the S. Obermayer Co., has occupied offices in the Roe building for a number of years, and the company, on account of the ever increasing demand for their goods, has found it necessary to carry a large stock of foundry facings and supplies to supply the immediate needs of the foundries in and adjacent to St. Louis, at a more accessible location.

Theodore Hofeller & Company, of Buffalo, N. Y., have just closed a long lease for a large five-story brick building and also an adjoining three-story building on Scott street adjoining the New York Central Railroad. The large building is 80 by 168 feet and the smaller one 32 by 168 feet, thereby giving the company about 70,000 square feet of floor space. Plans are under preparation for modernizing both structures by putting in two large electric freight elevators, fireproof stairways, steam heat, electric lighting, large baling presses, metal cutting machines and the most recent machinery for the conduct of a large scrap material business. The smaller building is to be entirely remodeled. The first floor will be used as a shipping and receiving room, with large doors at intervals along the side for loading and unloading cars. The street side will be thrown open for loading and unloading teams. In their new quarters the company will have facilities second to no other esetablishment of the kind in this country or Europe.

MEETINGS

At the annual meeting of the Russell & Erwin Company, New Britain, Conn., the following directors were chosen: Andrew J. Sloper, Frank L. Hungerford, Howard S. Hart, Benjamin A. Hawley, Isaac D. Russell, Philip Corbin, Chas. M. Jarvis and Charles J. Caley. The directors then chose the following officers: President, Howard S. Hart; vice president, B. A. Hawley; treasurer, Isaac D. Russell; secretary, Edward Meyer; general manager, Charles J. Caley. Mr. Caley, who is well known to all of the brass men, being president of the American Brass Founders' Association, is the oldest member of the board of directors, being 45 years of age. The rest of the board are younger, the president being but 44 years old.

At the annual meeting of the E. W. Bliss Company, Brooklyn, N. Y., manufacturers of machine tools, held on March 17, the following directors were re-elected: James W. Lane, Frank C. B. Page, Frederick D. MacKay, W. B. Bailey, Frank M. Leavitt, Chauncey Marshall, John J. Flynn, Arthur Wilzin, Wm. H. Truesdale, Jonathan Bulkley, Seth L. Keeney.

The new directors elected were: William H. Lyon, treasurer of the Charles Parker Company, Meriden, Conn., to succeed Thos. B. Kent, resigned, and Jesse H. Metcalf, Providence, R. I., to succeed W. E. Murdock, resigned.

After the stockholders' meeting the directors elected the following officers: James W. Lane, president; Frank C. B. Page, vice-president; Frederick D. MacKay, second vice-president; H. C. Seaman, secretary; Lucien H. Gould, treasurer.

FINANCIAL

The capital of the Premier Metal Company, of Syracuse, N. Y., has been increased from $16,000 to $30,000.

The Jordan Hardware Company, of Windham, Conn., has increased its capital from $54,000 to $100,000.

The International Nickel Company has declared a regular quarterly dividend of 1½ per cent. on its preferred stock, payable May 1.

The Hardwick Foundry & Machine Company, of Dallas, Tex., has amended its charter by increasing its capital stock from $50,000 to $80,000.

The Corbin Brothers Company, of New Britain, Conn., manufacturers of metal products, has filed a notice of its action in increasing its capital stock from $50,000 to $300,000.

A temporary receiver has been appointed for the Albany Brass & Iron Company, of Albany, N. Y. The application for a receiver was made by T. J. Sullivan, president and general manager of the company, and others. The court appointed Timothy J Sullivan temporary receiver. The assets of the company are placed at $35,600 and the liabilities at $35,800. As the liabilities are only a small amount in excess of the assets, it is hoped by the officers of the company to straighten out the affairs and continue business. Difficulty in making collections was the cause of the trouble.

A new plan for terminating the receivership of the Westinghouse Electric & Manufacturing Company, and financing the company, has been approved by the directors. According to this plan $10,000,000 of stock will be issued, $4,000,000 of which will be taken by the merchandise creditors. The balance is to be subscribed for by the stockholders. It is believed that the entire amount will be subscribed for at par by June 1. The further opinion is held that if this plan is rejected by the stockholders the company will be sold out by the creditors. In order to facilitate the work of obtaining subscriptions a committee of stockholders has been formed, to cooperate with the other committees. The composition of this committee is as follows: Charles Francis Adams, Boston; Charles J. Canda, New York; Alvin W. Krech, New York; George W. Guthrie, mayor of Pittsburg; and George T. Oliver, Pittsburg. The merchandise creditors' committee, which brought out the plan, represents more than one-half of the $4,250,000 owing this class of creditors. The new plan leaves the convertible bonds and the collateral notes undisturbed. The payments for the new stock are to extend over ten months.

INCORPORATIONS

Comstock Brass Company, of Cleveland, O., has been incorporated with a capital of $10,000 by C. W. Comstock, E. L Lutke and others.

The Independent Foundry Company, with its principal office in Portland, Ore., has been incorporated with a capital of $140,000 by C. E. Grelle, C. F. Swigert and William L. Brewster.

A. Joralemon & Son, Newark, N. J., has been incorporated with a capital of $5,000 to manufacture jewelry. The incorporators are S. C. Joralemon, Charles E. Williams and Charles L. Joralemon.

The Natural Wire & Metal Manufacturing Company, of Oklahoma City, Okla., has been incorporated with a capital of $500,000. The incorporators are J. M. Marsh, A. E. Seamon, Guy Miller and J. Eacock.

H. L. Hudson Company, of Brooklyn, N. Y., has been incorporated with a capital of $10,000 to make and sell decorated boxes. The incorporators are H. L. Hudson, E. D. Cronin and Frederick Knowlton, all of Brooklyn.

B. M. Shanley Jr., Company, Newark, N. J., has been incorporated with a capital of $100,000 to manufacture metal articles. The incorporators are Bernard M. Shanley, Jr., Thomas F. Pryor and Joseph V. Clark, all of Newark.

Universal Stamping Machine Company, of Hopatcong, N. J., has been incorporated with a capital of $100,000 to manufacture stamping machines. The incorporators are Hudson Maxim, Lillian Maxim, and George H. Graham.

Owens Brothers Company, has been incorporated at Auburn, Me., with a capital of $100,000 for the purpose of manufacturing and dealing in aluminum specialties. The officers are Henry W. Oakes, president; S. M. Farnham, Jr., treasurer.

Lyon & Son Manufacturing Company, of Newark, N. J., has been incorporated with a capital of $125,000 by Frederick M. Lyon, William G. Lyon and Joseph F. Papscoe. The company will manufacture buttons and brass novelties.

GOETZ & FLODIN MANUFACTURING COMPANY, Chicago, Ill., has been incorporated with a capital of $300,000 to manufacture and deal in metals and machinery. The incorporators are Edwin J. Mosser, Benjamin F. Ninde and John M. Bryant.

RAPID MOLDING DEVICE COMPANY, of Buffalo, N. Y., has been incorporated with a capital of $100,000 to manufacture molding and foundry devices. The directors are Maulsby Kimball, Clifford E. Branch, E. C. Shafer and B. Kerr, all of Buffalo.

MODERN FOUNDRY COMPANY, of Boston, Mass., has been incorporated with a capital of $10,000, for the purpose of dealing in castings, tools, etc. The incorporators are Henry O. Nichols, president; Everett E. Staples, treasurer; and Joseph Cummings.

EMIL SCHNEIDER, of Newark, N. J., has been incorporated to refine and smelt gold, silver, etc., and manufacture solder fluids and fluxes. The capital is $50,000. The incorporators are E. Schneider, O. Schneider and R. W. McChesney, all of Newark.

The Enuphyel Bronze Company, of New York city, has been incorporated with a capital of $100,000 by T. F. Adams, M. G. Palliser, both of New York city; T. Adams, Long Island city; and L. W. Thompson, of Plainfield, N. J. The company will manufacture bronzes.

The Delaware Stamp Machine Company has been incorporated at Dover, Del., with a capital of $100,000. The company will make a stamping machine which dates and numbers at the same time. Press reports state that New York and Philadelphia capitalists will finance the company and that a plant will be built at Dover.

The American Manganese Bronze Company has been incorporated under the laws of the State of New York with a capital of $100,000. The incorporators are W. Locke, H. A. Wilson and C. M. Gilpin, all of New York city. The officers are U. T. Hungerford, president, and W. A. Locke, secretary and treasurer. The company's plant will be at Tacony, Philadelphia, Pa., where they will manufacture manganese bronze and kindred alloys. The office is at 99 John street, New York. The business management of the corporation is in the hands of W. A. Locke, who has been a rolling mill agent and metal salesman for many years. U. T. Hungerford, the president, is also president of the U. T. Hungerford Brass & Copper Company, New York, known throughout the country.

Under the laws of New Jersey, a concern known as the Jonathan Bartley Crucible Company, has been incorporated. The president of which is Lewis Lawton, senior member of the firm of Lewis Lawton & Son. The vice-president is Joseph Crossley, who is president and treasurer of the Crossley-Manufacturing Company. A. M. Maddock, the treasurer, is a director and one of the principal men in the Thomas Maddock's Sons Pottery Company, and Lewis H. Lawton, the secretary, is the junior member of Lewis Lawton & Son, all of Trenton. Jonathan Bartley, the general manager, was superintendent for the Joseph Dixon Crucible Company in Jersey City, for the past twenty years. The company are capitalized at $125,000, all of which stock will be owned by seven men and will be fully paid in. The object of the concern is to manufacture graphite crucibles of all kinds.. They are erecting a new plant on Oxford street, Trenton, N. J., which will be built of brick and iron, fireproof throughout. This building will be completed about the first of August, and the company will be ready to go in the market about the first of December, 1908.

PRINTED MATTER

ACHESON-GRAPHITE, manufactured in the electric furnace by the International Acheson-Graphite Company, Niagara Falls, N. Y., is stated to be particularly adapted for electrodes and electrotyping. The electrodes are made in many shapes, and having no bonding material present, are solid pieces of graphite containing about 99.5 per cent pure graphite carbon. They can be machined, threaded and cut with the greatest ease. Their chief characteristics are long life and conductivity, low porosity and great economy.

MARINE REVERSE GEARS.—The increased use of motor boats for both business and pleasure has demanded a compact, powerful and at all times reliable reverse gear which would facilitate their control. The reverse gear designed and built by the Eureka Reverse Gear Company, 172 Pearl street, Hartford, Conn., accomplishes this. The company has developed an ingenious device in connection with a cone for gradually starting the dead load, and increasing the speed to equal speed of engine before making a positive engagement of the clutch.

BRASS FOUNDERS AND FINISHERS.—A large two-color catalogue has been received from the W. D. Allen Manufacturing Company, of 151 Lake street, Chicago, Ill., mentioning the very large line of brass goods made by them. Their product includes garden spray nozzles and sprinklers, hose pipes and fittings, Siamese connections, hose racks, oil cups, brass candlesticks, etc. Their candlesticks are all made in cast brass and finished in the best possible manner to stand the most discriminating inspection. The aim of the company is to make nothing but the best in this department and to produce only good designs and perfect goods. These articles are suitable for ornaments for the home and are always acceptable gifts.

METAL WORKING MACHINE TOOLS.—A large catalogue has been issued by the Garvin Machine Company, of Spring and Varick streets, New York city, describing their standard universal and plain milling machines, constant drive universal and plain milling machines, hand milling machines, vertical milling machines, motor driven milling machines, universal cutter and tool grinder, die slotters, etc. This business was established in 1865, and was incorporated in 1889. Although its beginning was modest, to-day it occupies some 100,000 square feet of floor space in a modern fireproof manufacturing building. The company not only manufactures, but it deals in and handles, machines tools of all kinds. The catalogue is handsomely gotten up, and the text is in English, French and German.

TUBE AND ROD MILL MACHINERY.—We have received from the Waterbury Farrel Foundry & Machine Company, of Waterbury, Conn., a very interesting catalogue dealing with their draw benches, wire reels, wire rod coilers, tube straighteners, etc. This catalogue is only one of several which describe the different machines made by the company for use in brass and copper mills. As occasion may arise the company are prepared to design and build new machines or to adapt those described to uses other than those for which they were originally planned. Many of the machines illustrated are equipped with motor drive; these can be furnished for either direct or alternating current. The all important features of first class materials and ample proportions, accompanied by the best workmanship, are fully recognized and consistently carried out in these, machines.

PLATING AND POLISHING SUPPLIES.—The Chas. F. L'Hommedieu & Sons Company, of 99-101 South Clinton street, Chicago, Ill., have prepared a very attractive and complete catalogue embracing entire plating plant equipments. This includes everything from sand paper to dyanoms. Their improved reliance plating tumbling barrel is adapted for plating and tumbling small articles in one operation, thereby saving the cost of copper wire on baskets and time of a man or boy in stringing the work to be plated. These barrels are on a low base, thereby making it easier for boys to operate them. They may be tipped at three angles and dumped by the pressure of the foot, or, if desired, the work can be scooped out. There is a special anode, of brass, bronze, nickel, or copper, which is adapted to the barrel. There are also described several patterns of plating dyanmos, polishing stands, glue pots, rheostats, as well as canvas and polishing wheels. These goods are all manufactured by the company and are the result of their many years' experience in this line of work. The company carry a large stock of high grade lacquers and can supply the trade with the best grades adapted to all classes of work. Their line of plating and polishing supplies is complete.

CATALOGUE BUREAU

THE METAL INDUSTRY has established a Catalogue Bureau by which it will prepare and do all the work necessary for the making of catalogues, pamphlets, circulars and other printed matter. Estimates will be furnished for writing the description, making engravings, printing, binding, in fact for the entire job from the beginning to the end or any part of it. Let us know your needs and we will tell you just exactly what we can do and what it will cost you. A catalogue should be a trade getter—that is the kind we produce. Write to the CATALOGUE BUREAU of THE METAL INDUSTRY, 61 Beekman street, New York.

METAL MARKET REVIEW

NEW YORK, April 10, 1908.

COPPER.—London prices for G. M. B. show a slight improvement for the month. Spot copper opened at £57 7s. 6d., advanced to £61 7s. 6. and closed at £59 17s. 6d. The market was fairly active and prices followed closely the manipulations of the New York prices.

The home copper market has been dull and disappointing, the demand has been rather better, but not enough to hold the market steady at any time. Reports given out by the selling agents about large export sales and heavy buying by domestic consumers, cannot be confirmed and are put down as Wall Street tips to affect the stock market. The market to-day looks weak and unsettled and is a buyer's market; there is enough copper apparently in second hands to more than fill the present demand. The exports for the month were 21.620 tons, against 13.432 same month a year ago. We call the market to-day more or less nominal. Lake around 13 cents, electrolytic 12¾, and casting 12½ cents.

TIN.—Tin in the London market shows a net advance for the month of about £16 per ton. The shipments were nominal and the figures generally were not very interesting.

The New York market has followed closely the fluctuations in the London market. The demand has been good, with a consumption of over 3,100 tons. The tin business is in pretty good shape and higher prices are freely predicted. Market closes today around 32 cents for 5-10 ton lots and 10 to 15 points higher on 1 ton lots.

LEAD.—The foreign lead market has ruled quiet and steady with slight fluctuations during the month, closing at £14 5s.

The New York market advanced about ¼ cent per pound during the month, from 3.70 to 4.00, the Trust price, but at the close the outside interests are able to take care of the present demand at prices slightly below the Trust price of 4 cents. We quote the market 3.90 to 3.95 New York carload lots—small lots from store 15 to 20 points higher.

SPELTER.—The London spelter market has ruled around £21 during the month and the effect of the German agreement seems to be pretty well discounted.

There has been very little change in the New York or Western spelter market, prices ranging around 4.50 to 4.55, East St. Louis, and from 4.70 to 4.75, New York, with sellers over at the higher level to-day.

ANTIMONY.—The foreign prices are a trifle lower and market is inclined to be easier.

In New York the antimony market is dead, with the smallest kind of a consuming demand that is taken care of several times over—Cooksons around 8.75, Halletts 8.50, other brands 7.75 to 8 cents.

ALUMINUM.—Prices for aluminum are unchanged, demand is poor, 33 to 35 cents per pound is quoted, according to quantity and quality.

SILVER.—The silver market has varied very slightly, around 25¼ to 25½d. in London and 55 to 55¾ cents in New York.

PLATINUM.—The market for platinum is quiet and easier, with prices $2 per ounce lower.

SHEET METALS.—There has been no change in the prices of sheet copper or copper wire. There is a little more doing and one of the largest wire drawers in the country reports a better business from small consumers all over the country than for several months.

OLD METALS.—The old metal market is dull and disappointing, consumers will not buy on any advance and dealers don't care to sell on the declines all the time, so there is very little business doing and the outlook is not encouraging.

THE MARCH MOVEMENTS IN METALS

	Highest.	Lowest.	Average.
COPPER—			
Lake	13.25	12.50	12.75
Electrolytic	13.00	12.50	12.70
Casting	12.75	12.00	12.50
TIN	32.35	29.25	30.50
LEAD	4.00	3.70	3.75
SPELTER	4.75	4.70	4.70
ANTIMONY (Halletts)	8.85	8.50	8.70

DAILY METAL PRICES

We have made arrangements with the New York Metal Exchange by which we can furnish our readers with the Official Daily Metal Market Reports of the Exchange and a year's subscription to THE METAL INDUSTRY for the sum of $10. The price of the Report alone is $10. Sample copies furnished for the asking. We can also furnish daily telegraphic reports of metal prices.

ANALYZING AND TESTING BUREAU

THE METAL INDUSTRY is independent of all laboratories, but we offer our services in directing our readers where they can get metals, materials and supplies analyzed and tested to the best advantage. We have an intimate knowledge of the best laboratories in the country and know the specialties of the different ones. Cost for analysis or test furnished on receipt of sample.

INFORMATION BUREAU

Any concern intending to buy metals, machinery and supplies and desiring the names of the various manufacturers and sellers of these products can obtain this information by writing to THE METAL INDUSTRY. Our Information Bureau is for the purpose of answering questions of all kinds.

AD. WRITING

This department prepares advertising copy and makes cuts, photos or drawings. Our experience, and what skill we may have in ad. writing, are at your disposal at all times and as often as you may desire without cost to you. If it is a task for you to get ready your advertisements, send to THE METAL INDUSTRY.

See Advertising Pages 21 and 22 Following for Trade Wants

Metal Prices, April 13, 1908

NEW METALS.

	Price per lb.
Copper, Pig, Bar and Ingot and Old Copper. Duty Free. Manufactured 2½c. per lb.	
Lake car load lots	13.00
Electrolytic, car load lots	12.85
Casting, car load lots	12.50
Tin—Duty Free.	
Straits of Malacca, car load lots	32.00
Lead—Duty Pigs, Bars and Old 2½c. per lb., pipe and sheets 2½c. per lb.	
Pig lead, car load lots	4.00
Spelter—Duty 1½c. per lb.	
Western, car load lots	4.75
Aluminum—Duty Crude, 8c. per lb. Plates, sheets, bars and rods 13c. per lb.	
Small lots	35.00
100 lb. lots	34.00
Ton lots	33.00
Antimony—Duty ¾c. per lb.	
Cookson's, cask lots, nominal	8.75
Halletts, cask lots	8.50
Other, cask lots	7.75
Nickel—Duty 6c. per lb.	
Shot, Plaquettes, Ingots, Blocks, according to quantity	.45 to .60
Manganese—Duty 20%	.80
Magnesium—Duty Free	$1.40
Bismuth—Duty Free	1.80
Cadmium—Duty Free	1.40
	Price per oz.
Gold—Duty Free	$20.67
Silver—Duty Free	.54¾
Platinum—Duty Free	27.00
Quicksilver—Duty 7c. per lb. Price per pound	.63c. to 64c.

OLD METALS.

	Price per lb.	
Heavy Cut Copper	11.00	11.50
Copper Wire	10.50	11.00
Light Copper	9.25	9.75
Heavy Mach. Comp.	10.50	11.00
Heavy Brass	8.00	8.50
Light Brass	6.00	7.00
No. 1 Yellow Brass Turnings	7.00	7.50
No. 1 Comp. Turnings	8.00	9.00
Heavy Lead	3.50	3.60
Zinc Scrap	3.00	3.50
Scrap Aluminum, turnings	6.50	7.00
Scrap Aluminum, cast, alloyed	16.00	18.00
Scrap Aluminum, sheet (new)	18.00	19.00
Old Nickel, solid	20.00	25.00
No. 1 Pewter	18.00	19.00

INGOT METALS.

	Price per lb.	
Silicon Copper	according to quantity	33 to 38
Phosphor Copper, 5%	" "	19 to 21
Phosphor Copper, 10% to 15% Guaranteed	" "	28 to 30
Phosphor Tin	" "	34 to 36
Brass Ingot, Yellow	" "	10 to 12
Brass Ingot, Red	" "	12 to 14
Bronze Ingot	" "	12 to 14
Manganese Bronze	" "	17 to 19
Phosphor Bronze	" "	16 to 19
Casting Aluminum Alloys	" "	29 to 35

Phosphorus—Duty 18c. per lb.
According to quantity ..... 30 to 40

PRICES OF HOT ROLLED SHEET COPPER.

Sizes of Sheets	64 oz. and over 50 lb. sheet 30 x 60 and heavier.	32 oz. to 64 oz. 25 to 50 lbs. sheet 30 x 60.	24 oz. to 32 oz. 18¾ to 25 lb. sheet 30 x 60.	16 oz. to 24 oz. 12½ to 18¾ lb. sheet 30 x 60.	14 oz. and 15 oz. 11 to 12½ lb. sheet 30 x 60.	12 oz. and 13 oz. 9½ to 11 lb. sheet 30 x 60.	10 oz. and 11 oz. 7⅞ to 9½ lb. sheet 30 x 60.	8 oz. and 9 oz. 6¼ to 7⅞ lb. sheet 30 x 60.	Lighter than 8 oz.
	CENTS PER POUND.								
Not wider than 30 ins. — Not longer than 72 inches.	17	17	17	17	18	19	20	23	26
Not wider than 30 ins. — Longer than 72 inches. Not longer than 96 inches.	17	17	17	17	18	20	23	26	
Not wider than 30 ins. — Longer than 96 inches.	17	17	17	17	19	23			
Wider than 30 ins. but not wider than 36 inches. — Not longer than 72 inches.	17	17	17	17	19	21	24	27	
Wider than 30 ins. but not wider than 36 inches. — Longer than 72 inches. Not longer than 96 inches.	17	17	17	17	19	23	26		
Wider than 30 ins. but not wider than 36 inches. — Longer than 96 inches. Not longer than 120 inches.	17	17	17	18	20				
Wider than 30 ins. but not wider than 36 inches. — Longer than 120 inches.	17	17	18	19					
Wider than 36 ins. but not wider than 48 inches. — Not longer than 72 inches.	17	17	18	19	21	24	27		
Wider than 36 ins. but not wider than 48 inches. — Longer than 72 inches. Not longer than 96 inches.	17	17	18	20	22	25			
Wider than 36 ins. but not wider than 48 inches. — Longer than 96 inches. Not longer than 120 inches.	17	17	19	21	25				
Wider than 36 ins. but not wider than 48 inches. — Longer than 120 inches.	17	18	20	23					
Wider than 48 ins. but not wider than 60 inches. — Not longer than 72 inches.	17	17	18	20	23	28			
Wider than 48 ins. but not wider than 60 inches. — Longer than 72 inches. Not longer than 96 inches.	17	17	19	21	26				
Wider than 48 ins. but not wider than 60 inches. — Longer than 96 inches. Not longer than 120 inches.	17	18	20	23					
Wider than 48 ins. but not wider than 60 inches. — Longer than 120 inches.	18	19	21	25					
Wider than 60 ins. but not wider than 72 ins. — Not longer than 96 inches.	17	18	20	25					
Wider than 60 ins. but not wider than 72 ins. — Longer than 96 inches. Not longer than 120 inches.	17	19	22	27					
Wider than 60 ins. but not wider than 72 ins. — Longer than 120 inches.	18	20	25						
Wider than 72 ins. but not wider than 108 ins. — Not longer than 96 inches.	18	20	23						
Wider than 72 ins. but not wider than 108 ins. — Longer than 96 inches. Not longer than 120 inches.	19	21	24						
Wider than 72 ins. but not wider than 108 ins. — Longer than 120 inches.	20	22	26						
Wider than 108 ins. — Not longer than 132 inches.	21	23							
Wider than 108 ins. — Longer than 132 inches	22	25							

Rolled Round Copper, ⅝ inch diameter or over 17 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 3½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

COPPER BOTTOMS, PITS AND FLATS.

14 oz. to square foot and heavier, per lb.	21c.
12 oz. and up to 14 oz. to square foot, per lb.	22c.
10 oz. and up to 12 oz.	24c.
Lighter than 10 oz.	27c.

Circles less than 8 in. dia., 2c. per lb. additional.

Circles over 13 in. dia. are not classed as Copper Bottoms.

Polished Copper Bottoms and Flats, 1c. per lb. extra.

Zinc—Duty, sheet, 2c. per lb.

	Price per lb.
600 lb. casks	7.50
Open casks	8.00

Metal Prices, April 13, 1908

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect March 23, 1908, and until further notice.

To customers who purchase less than 40,000 lbs. per year and over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.13⅜	$0.15⅝	$0.17⅜
Wire ¼" and larger	.14	.16½	.18
Wire, smaller than ¼" to No. 8 inclusive	.14⅜	.16⅝	.18⅜
Wire, smaller than No. 8 to No. 10 inclusive	.15⅛	.17⅜	.19¼
Rods, ¼" and larger to ½" diameter	.14⅛	.16⅜	.19⅛
Rods, ½" to 1" diameter, both inclusive	.14	.16⅛	.19
Brazed tubing	.20¼	—	.22¾
Open seam tubing	.18¼	—	.20¾
Angle and channel, plain	.20¼	—	.24

30% discount from all extras except for quality.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass	½c.	per lb. net advance.
" —Best spring, drawing and spinning brass	1½c.	" " " "
Wire—Extra spring and brazing brass wire	½c.	" " " "
" —Best spring and brazing brass wire	1c.	" " " "

To customers who purchase less than 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.14⅜	$0.16⅞	$0.18⅜
Wire, ¼" and larger	.15	.17⅛	.19
Wire, smaller than ¼" to No. 8 inclusive	.15⅜	.17⅞	.19⅜
Wire, smaller than No. 8 to No. 10 inclusive	.16¼	.18⅜	.20¼
Rods, ¼" and larger to ½" diameter	.15¼	.17⅜	.20¼
Rods, ½" to 1" diameter, both inclusive	.15	.17⅛	.20
Brazed tubing	.21¼	—	.23⅝
Open seam tubing	.19¼	—	.21⅝
Angle and channel, plain	.21¼	—	25

5% discount from all extras except for quality.

NET EXTRAS FOR QUALITY.

Same as above.

BARE COPPER WIRE—CARLOAD LOTS.

14¾c. per lb. base.

SOLDERING COPPERS.

300 lbs. and over in one order	19c.	per lb. base
100 lbs. to 300 lbs. in one order	19½c.	" " "
Less than 100 lbs. in one order	21c.	" " "

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ in. O. D. Nos. 4 to 13 Stubs' Gauge, 18c. per lb.
Seamless Copper Tubing, 21c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe Size.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb.	26	25	20	19	18	18	18	18	18	18	18	19	20	22	24	25

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 feet. Brass.	Bronze.
⅜ inch	$8	$9
½ inch	8	9
⅝ inch	10	11
¾ inch	12	13
⅞ inch	14	15
1 inch	18	20
1¼ inch	22	24
1¼ inch	25	27
1½ inch	32	35
1⅝ inch	45	48
2 inch	56	60

Discount 45 and 5%.

PRICES FOR MUNTZ METAL AND TOBIN BRONZE.

Muntz or Yellow Metal Sheathing (14" x 48")	14c. lb. net base
" " " Rectangular Sheets other than Sheathing	16c. " " "
" " " Rod	15c. " " "
Tobin Bronze Rod	17c. " " "

Above are for 100 lbs. or more in one order.

PLATERS' METALS.

Platers' bars in the rough, 23c. net.

German silver platers' bars dependent on the percentage of nickel, quantity and general character of the order.

Platers' metal, so called, is very thin metal not made by the larger mills and for which prices are quoted on application to the manufacturers.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Not over 18 in. in width, not thinner than 23 B. S. Gauge, 4c. above price of pig tin in same quality.

Not over 35 in. in width, not thinner than 22 B. S. Gauge, 5c. above price of pig tin.

PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

	Wider than..... 3in.	6in.	14in.	16in.	18in.	20in.	24in.	30in.	36in.
	and including.... 12in.	14in.	16in.	18in.	20in.	24in.	30in.	36in.	40in.
	In coils.								
No. 13 and heavier	40	40	42	42	42	42	45	45	45
" 14	40	40	42	42	42	42	45	45	45
" 15	40	40	42	42	42	42	45	45	45
" 16	40	40	42	42	42	42	45	45	45
" 17	40	40	42	42	42	42	45	45	45
" 18	40	40	42	42	42	42	45	45	48
" 19	40	40	42	42	42	42	45	46	49
" 20	40	42	42	42	42	44	47	48	50
" 21	40	44	44	44	44	46	49	50	56
" 22	40	44	44	44	46	46	49	53	57
" 23	40	44	44	44	46	46	49	55	58
" 24	40	44	46	48	48	48	51	57	60
" 25	42	45	47	49	49	49	52	59	63
" 26	42	45	48	52	52	52	57	61	67
" 27	42	46	50	54	54	55	60	64	70
" 28	42	46	52	54	55	55	62	68	73
" 29	44	47	54	56	58	58	67	73	78
" 30	44	48	56	58	62	68	76	78	83
" 31	49	53	61	64	69	77	80	83	89
" 32	51	55	63	67	75	83	90	96	101
" 33	53	57	66	71	79	90	97	106	116
" 34	56	61	68	76	84	97	109	116	126
" 35	..	71	76	86	96	106	121	131	..
" 36	..	86	96	106	121	126	141	..	..
" 37	..	110	114	135	150	165	180	..	..
" 38	..	130	145	160	175	190	210	..	..
" 39	..	150	170	190	210	230	..	..	..
" 40	..	180	210	230	250	..	..	..	..

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICE LIST OF SEAMLESS ALUMINUM TUBING.

Stubs' G. B. & S. G.	1¼"	1½"	1¾"	2"	2¼"	2½"	2¾"	3"	3¼"	3½"	3¾"	4"	4¼"	4½"
4 to 11 / 3 to 9	BASE PRICE 50 CENTS.											3	3	3	10
12 / 10												6	6	6	13
13 / 11												10	10	10	16
14 / 12	3	3	3	3	3	3	3	3	3	3	3	13	13	13	19
15 / 13	3	3	3	3	3	3	3	3	3	3	3	19	19	19	22
16 / 14	6	6	6	6	6	6	6	6	6	6	16	19	22	25	35
17 / 15	10	10	10	10	10	10	10	10	16	19	22	25	29	38	
18 / 16	13	13	13	13	13	13	13	19	22	25	29	32	35	44	
19 / 17	16	16	16	16	16	16	22	25	29	32	35	41	48	54	
20 / 18-19	19	19	19	19	19	22	22	25	29	35	35	41	60	60	
21 / 20	22	22	22	22	22	..	..	..	..	..	..	..	..	..	
22 / 21	25	25	25	25	25	..	..	..	..	..	..	..	..	..	
23 / 22	35	35	35	41	48	..	..	..	..	..	..	..	..	..	
24 / 23	57	60	60	63	67	..	..	..	..	..	..	..	..	..	
25 / 24	73	76	..	..	..	..	..	..	..	..	..	..	..	..	

Prices are for ten pounds or more at a time. For prices on smaller sizes send for manufacturers' list.

PRICE LIST FOR ALUMINUM ROD AND WIRE.

Diameter B. & S. G'ge.	000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price, per lb....	38	38½	38½	39	39½	40	40½	41	42	43	44	47	52

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12	$0.52	16	$0.58
13	.53	17	.59
14	.54	18	.60
15	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 50%.

GERMAN SILVER TUBING.

4 per cent.	to No. 19, B. & S. Gauge, inclusive			$0.60
6 "	" 19, " " "			.70
9 "	" 19, " " "			.85
12 "	" 19, " " "			1.00
15 "	" 19, " " "			1.15
16 "	" 19, " " "			1.20
18 "	" 19, " " "			1.30

German Silver Tubing thinner than No. 19 B. & S. Gauge add same advances as for Brazed Brass Tube.

For cutting to special lengths add same advances as for Brazed Brass Tube. Discount 40%.

PRICE OF SHEET SILVER.

Rolled sterling silver .925 fine is sold according to gauge quantity and market conditions. No fixed quotations can be given as prices range from 2c. below to 6c. above the price of bullion.

Rolled silver anodes .999 fine are quoted at 2c. above the price of bullion.

TRADE WANTS

AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.

Advertisements will be inserted under this head at 40 cents per line, 3 lines one dollar, for each insertion, excepting Situations Wanted, 20 cents per line, 3 lines half a dollar. Answers sent in our care will be forwarded.

FOR SALE

Plant fully equipped for the manufacture of steam goods.

Everything complete, building, ground, up-to-date machinery, foundry equipment, engine, boilers, etc. Situated in good, thriving Indiana town. Elegant R. R. facilities.

PRICE REASONABLE

WILL ARRANGE TERMS TO SUIT

Address A—1, care of THE METAL INDUSTRY

We have for sale a

SECOND HAND PLATING DYNAMO

on account of same being too small for our work:

One 6 volt Card Machine rated at 700 amperes, cost $350.00, new, 8 years ago **for sale at $80.00**

F. O. B. PERU, ILL.

AMERICAN NICKELOID & MFG. CO., - Peru, Ill.

FOR SALE—AT BARGAIN RATES

ROLLING MILLS, POLISHING HEADS and all kinds of machinery required by SILVERSMITHS and MANUFACTURERS JEWELERS. We carry a general line and render prompt shipment.

THOMAS McWILLIAMS, 237 Eddy Street, PROVIDENCE, R. I.

FOR SALE

A PHOENIX PLATING DYNAMO

6 volts. 3000 Amperes. Direct connected to 33 H. P. 230 Volt Direct Current Motor. In good working condition. **Address Box W, care of THE METAL INDUSTRY**

FOR SALE

The oldest job plating plant in Rochester, N. Y.

Established 1887. Doing work for the best firms in the city. Write for particulars and reasons for selling.

G. A. TUCKER, 14 Commercial St., ROCHESTER, N. Y.

FOR SALE—IMPROVED DRILL CHUCKS that are needed in every METAL WORKING SHOP. Address DRILL CHUCK, care THE METAL INDUSTRY.

FOR SALE—LATHES and DRILL CHUCKS, Face Plate Jaws, Centering Chucks, Planer Chucks, etc. Immediate shipment guaranteed. Address LATHE CHUCK, care THE METAL INDUSTRY.

FOR SALE—Prompt Shipment. DROP PRESSES and AUTOMATIC DROP LIFTER to suit all requirements. Address DROP, care THE METAL INDUSTRY.

WANTED—A second hand 14 POT FURNACE. Address BOX A-6, care THE METAL INDUSTRY.

METALS, MACHINERY AND SUPPLIES FOR SALE—Cont'd

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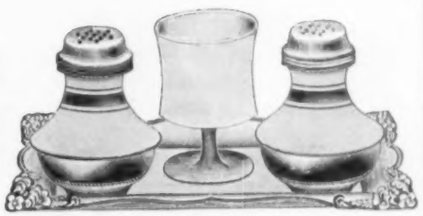

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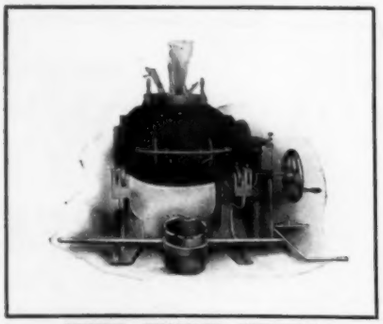

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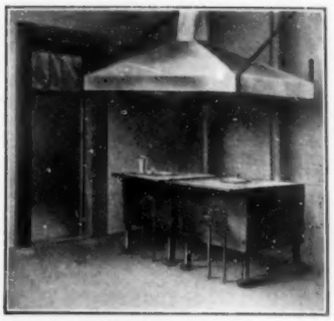

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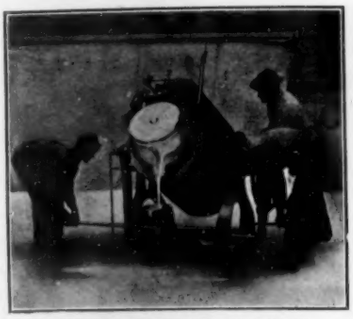

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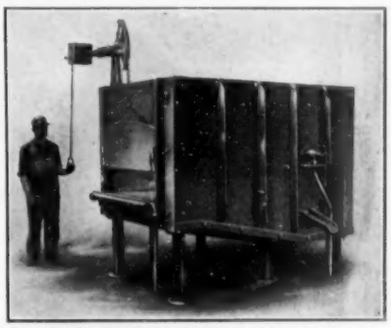

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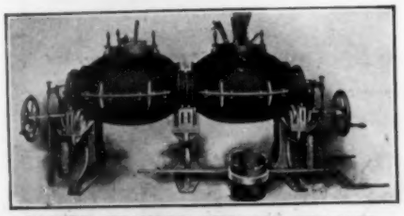

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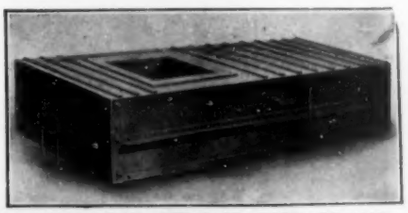

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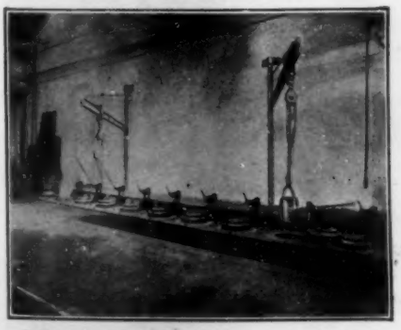

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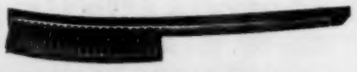

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